UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PREVENTION, PESTICIDES, AND TOXIC SUBSTANCES
WASHINGTON, D.C. 20460

January 27, 2000

MEMORANDUM

SUBJECT: The revised Occupational and Residential Exposure aspects of the HED Chapter of the Reregistration Eligibility Decision Document (RED) for Phosmet, Case #838564, PC Code 059201, DP Barcode D262366

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The purpose of this revision to the occupational and residential risk assessment for phosmet is to incorporate data recently submitted to the Agency. The data, submitted by the registrants (Gowan Company and Schering-Plough), include a dermal toxicity study and a probabilistic post-application risk assessment. A preliminary summary of the results of an unpublished study presented by Dr. Janice Chambers of Mississippi State University at the 1999 Society of Toxicology national meeting in New Orleans focused on phosmet residues on treated companion animals (dogs) have also been used for risk characterization purposes. Additionally, recent proposed revisions to the Agency's *SOPs For Residential Exposure Assessment* have been incorporated into this document.

The following labels (identified by EPA Reg. No.) served as the basis for this assessment: 773-076, 2724-169, 2724-262, 10163-166, 10163-167, 10163-168, 10163-169, 10163-170, 10163-171, 10163-172, 10163-173, 10163-174, 10163-175, 10163-184, 10163-215, 10163-227, and 28293-015. There was also a variety of section 24 C (SLN) labels that were evaluated in the completion of this risk assessment. The exposure scenarios based on the use patterns in those labels are essentially reflected in the assessments completed for the labels listed above (e.g., mostly groundboom application to blueberries and sweet potatoes). As such, no additional scenarios were added to the assessment based solely on the uses contained in a 24C label.

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EXECUTIVE SUMMARY

Phosmet [N-(mercaptomethyl) phthalimide S-(0, 0-dimethyl phosphorodithioate)], is a broadpsectrum organophosphate insecticide that is marketed in a variety of end-use products. Phosmet formulations include dusts, soluble concentrates, emulsifiable concentrates, and wettable powders. Phosmet is used in agriculture to control pests on terrestrial crops including fruit and nut trees (e.g., almond and pear), on grapes, and on field and vegetable crops (e.g., blueberries, cotton and potatoes). Phosmet is also used for direct animal treatments to control pests on cattle, swine, and dogs. There are other uses such as in forestry and for ornamentals, including residential sites, that can be treated by professional applicators (e.g., seedling dips, shade trees, shrubs). Most of these uses appear to be for arborist/tree surgeon maintenance of deciduous shade trees. Phosmet can also be used by homeowners to treat trees and shrubs, ornamentals, pets (dogs only) and gardens. Phosmet can be applied using a wide array of application equipment. In agriculture, groundboom, airblast, and aerial applications can be made. Other applications are completed using handheld equipment such as low pressure handwand sprayers and backpack sprayers.

No chemical-specific handler exposure data were submitted in support of the reregistration of phosmet. As a result, the Pesticide Handlers Exposure Database was used to complete all occupational and residential handler risk assessments. Chemical-specific dislodgeable foliar residue data were submitted for citrus, pears, and grapes. Additionally, a post-application exposure study that monitored homeowner exposures while harvesting and maintaining pear trees was submitted. All of these data were used in the risk assessment. The Agency also used data for phosmet residues on treated dogs to characterize the risks associated with the use on companion animals (i.e., dogs only). The exposed populations considered in this risk assessment are the occupational handlers of phosmet (i.e., those involved in the application process as part of their jobs) and also homeowner handlers (i.e., those involved in applications not as part of their jobs, typically in and around their residences). Individuals who are exposed because they enter previously treated areas were also considered (i.e., post-application exposures). These individuals could be exposed as part of their jobs (e.g., agricultural harvesters) or they can be exposed because of activities in and around their residences. The residential post-application assessment considered both adults and children of various ages including infants and toddlers.

The risk assessment has been revised to incorporate the recent submission of various toxicity data. In previous assessments, the endpoint (1.1 mg/kg/day) used for the dermal risk assessment was selected from a chronic feeding study in rats which was used in conjunction with a 10 percent dermal absorption factor. In this assessment, the endpoint (15 mg/kg/day) from a dermal toxicity study was applied to dermal exposures up to 30 days and the endpoint (1.1 mg/kg/day) from the chronic feeding study in rats was retained and coupled with a 10 percent dermal absorption factor for all dermal exposures greater than 30 days in duration. The inhalation component of the risks was calculated using oral administration studies. In the previous assessment, the endpoint for both short- and intermediate-term inhalation risk calculations was also from the chronic toxicity study in rats. In this assessment, for short-term inhalation exposures ($\leq$7 days), the Agency has selected an endpoint (4.5 mg/kg/day) from a rat acute neurotoxicity study. For intermediate-term inhalation exposures (exposure durations >7 but$\leq$ 30 days), the Agency has selected an endpoint (1.5 mg/kg/day) from a

rat subchronic neurotoxicity study. For intermediate-term inhalation exposures (exposure durations > 30 days), the Agency has again retained the endpoint (1.1 mg/kg/day) from the chronic rat feeding study. The uncertainty factors for all exposures considered is 100 (i.e., includes occupational and residential scenarios). The selection of endpoints has caused the Agency to complete three distinct risk assessments for the durations of concern including: (1) for durations that less than 7 days, (2) durations greater than 7 days but less than 30 days, and (3) for durations greater than 30 days. Nondietary ingestion risks in this assessment were also calculated using an endpoint (4.5 mg/kg/day) the acute neurotoxicity study in rats. This is the same endpoint that has been selected as the basis for the acute RfD (Reference Dose for dietary risk assessment). These risks were combined with the dermal risks using an Agency method for aggregating exposures as appropriate.

The Agency has several concerns over the use of phosmet in a variety of marketplaces (i.e., agriculture, for direct animal treatments, and for ornamentals), particularly related to any use that can result in a residential exposure. The occupational handler risks can be mitigated in large part with additional protective measures such as personal protective equipment and/or engineering controls. No data were submitted for the handler aspect of the risk assessment.

Risk values for postapplication exposures (i.e., those that will be used to propose Restricted Entry Intervals or REIs, current labels are 24 hours) have also been recalculated for various crops and activities that are thought to be representative of the exposures associated with phosmet. Generally, the risk levels indicate that tree crops (i.e., nuts, pears, and apples at the highest rate considered) should have REIs that are greater than 50 days with the exception of apples on the East Coast were the maximum application rate is decidely lower than for the other tree crops considered. For grapes, the proposed REI for each activity considered is 44 days. For low crops and caneberries, REIs ranged from 18 to 25 days. A low exposure activity (i.e., scouting low row crops and early season cotton) was also considered. The proposed REI for this scenario is 4 days. These calculations were based on chemical-specific dislodgeable foliar residue data. The Agency also completed an assessment for intermediate-term exposures that are greater than 30 days because the Agency does not have the use and usage data required to completely eliminate this exposure scenario from consideration. The Agency, however, does not believe this is a likely exposure scenario because of the way phosmet is used and also believes that any populations who are exposed in this manner would be small groups of professional applicators or farmworkers. The results for these extended duration calculations, however, support the above, proposed REI durations.

The residential handler risks are generally not a concern to the Agency except for some wettable powder uses. In contrast, all residential post-application exposure scenarios are, however, of concern to the Agency with the exception of maintaining and harvesting apples on the East Coast (i.e., at the maximum application rate on the east coast of 1.5 lb ai/acre). The risk values calculated for all exposure scenarios involving children in this assessment indicate MOEs that exceed the Agency's level of concern in all cases.

1. BACKGROUND INFORMATION

This memo was developed based on previous versions of the phosmet risk assessment and other information contained in the following documents:

- *United States Environmental Protection Agency, Guidelines for Exposure Assessment*; Federal Register Volume 57, Number 104 (Friday May 29, 1992).

- *United States Environmental Protection Agency, Draft Standard Operating Procedures (SOPs) For Residential Exposure Assessment* (December 11, 1997).

- *United States Environmental Protection Agency, Series 875 - Occupational and Residential Exposure Test Guidelines, Group B - Postapplication Exposure Monitoring Test Guidelines*; Version 5.4; (February 10, 1998).

- *United States Environmental Protection Agency, Exposure Factors Handbook,* EPA Report 600/P-95/002Fa, August, 1997.

- August 4, 1999 EPA HIARC report for phosmet and revised HIARC report memo of December 20, 1999.

- *Fur Residue and Plasma Cholinesterase Inhibition of Dogs Dipped with Chlorpyrifos or Phosmet*: Boone, J.S.; Tyler, J.; and Chambers, J.E. (Data gathered under EPA grant R 825170-01-0). Preliminary data presented by Dr. Janice Chambers of Mississippi State at the 1999 Society of Toxicology meeting in New Orleans, Louisianna (Mississippi State University College of Veternary Medicine, P.O. Box 9825, Mississippi State, MS 39762-9825).

- *Dislodgeable Residue Dissipation and Reentry Interval Calculations For Crops Treated With Products Containing Phosmet:* Submitted by Stauffer (now Zeneca) Chemical Company; Study Completion Date: 10/22/86; Report Date: 1/16/87; Authors: Dick Knarr, Yutaka Iwata, and Kay Curry; EPA MRID 404253-01.

- *Homeowner Exposure to Phosmet While Performing Typical Activities with Imidan Insecticide-Treated Fruit Trees:* Submitted by Stauffer (now Zeneca) Chemical Company; Study Completion Date: 10/22/86; Report Date: 12/19/86; Authors: Dick Knarr and Yutaka Iwata; EPA MRID 401223-01.

- *Review of Postapplication/Reentry Data Submitted to Support the Reregistration of Phosmet and Revision of Data Required by the 8/30/91 DCI for Phosmet (HED Project # 9-0839):* A memo from Peg Perreault of the former Occupational and Residential Exposure Branch of HED to Lois Rossi, Special Review and Reregistration Division.

- *Phosmet Dermal Passive Dosimetry Exposure Addendum to MRID 404253-01:* Submitted by the Gowan Company, Yuma Arizona; Completion Date: 12/8/92; Author: E. Codrea; EPA MRID 425958-01 (submitted with 12/14/92 letter described below).

- *Letter from Gowan Company, Yuma Arizona to Ms. Brigid Lowery of EPA/OPP/SRRD (Phosmet CRM) Dated December 14, 1992:* Author: Elizabeth Codrea, Regulatory Product Manager; EPA MRID 425958-00.

- *The ORE aspects of the HED Chapter of the Reregistration Eligibility Decision Document (RED) for Phosmet, Case #838564, PC Code 059201, DP Barcode D236026*; Dated May 12, 1998; From Jeff Dawson (Chemist, OPP/HED/RRB-1) to Christina Swartz (Chemist, OPP/HED/RRB-1).

- *Phosmet: Response to comments received on the documents entitled "The ORE Aspects of the HED Chapter for the RED for Phosmet, dated May 12, 1998 Case #838564, PC Code 059201, DP Barcode D252048*; Dated January 13, 1999; From Jeff Dawson (Chemist, OPP/HED/RRB-1) to Christina Swartz (Chemist, OPP/HED/RRB-1).

- Updated *Quantitative Usage Analysis for Phosmet*, completed by Jihad Alsadek of OPP/BEAD dated June 2, 1999.

- *Phosmet: Human Health Risk Assessment and Supporting Documentation for the RED, DP Barcode D236026*, Dated October 30, 1998; From Christina Swartz (Chemist, OPP/HED/RRB-1) to Linda Werrell (OPP, Special Review and Reregistration Division).

- *Gowan Chemical Company 30 day Response to HED RED Preliminary Risk Assessment for Phosmet dated October 30, 1998*; faxed December 14, 1998; From Elizabeth Codrea, Regulatory Product Manager at Gowan to Linda Werrell, Chemical Review Manager, U.S. EPA, Office of Pesticide Programs, Special Review and Reregistration Division.

- *Initial Schering-Plough Animal Health Corporation Response to OPP Preliminary Health Assessment for Phosmet*; faxed December 11, 1998; From Iain Weatherston, Senior Regulatory Consultant at Technology Sciences Group, Inc. (an agent for Schering-Plough Animal Health Corporation) to Linda Werrell, Chemical Review Manager, U.S. EPA, Office of Pesticide Programs, Special Review and Reregistration Division.

- *Preliminary Evaluation of Handler Exposures to Phosmet*, Author: Douglas G. Baugher, Ph.D.; Completed on April 13, 1999 by EXP Corporation, 660 Orchard Lane, Aspers PA 17304; Sponsor: Gowan Company, 370 South Main Street, Yuma AZ 85364; EXP Project No. 43498 -- Report No. 99020/PHOS.

- *Preliminary Evaluation of Phosmet Dislodgeable Foliar Residues and Reentry Intervals: Conventional and Monte Carlo Assessments*, Author: Douglas G. Baugher, Ph.D.; Completed on May 17, 1999 by EXP Corporation, 660 Orchard Lane, Aspers PA 17304; Sponsor: Gowan Company, 370 South Main Street, Yuma AZ 85364; EXP Project No. 43498 -- Report No. 99022/PHOS.

- *A Backrubber To Control Buffalo Flies* (by K.S. Waters and T.J. Reid of the Queensland Australia Department of Primary Industries).

- *Seasonal Labor in California Agriculture, Labor Inputs For California Crops* (by J.W. Mamer and A. Wilkie, University of California, Department of Agricultural and Resource Economics Cooperative Extension, December 1990).

- *Vegetable Gardening in Virginia*, Wesley P. Judkins, Extension Division of Virginia Polytechnic Institute and State University, Publication 44, September 1975.

- *NIOSH Respirator Decision Logic*, US Department of Health and Human Services, Public Health Service, Centers For Disease Control, National Institute for Occupational Safety and Health, May, 1987.

The recent submission of new toxicity data has altered the structure of the risk assessment for phosmet. Additionally, several of the uses that were included in the original assessment have been withdrawn by the registrants. In effect, all calculations included in this assessment have been revised to reflect the recent data submission and updated toxicology considerations. Specifically, the major revisions and modifications completed by the Agency in this document that differ from the December 1998 risk assessment include:

- Short- and intermediate-term (exposures $\leq$ 30 days) risks from dermal exposures to phosmet were calculated using the endpoint from the recently submitted 21 day dermal toxicity study in rats. The NOAEL (No Observed Adverse Effect Level) observed in this study is 15 mg/kg/day. For intermediate-term dermal exposures greater than 30 days, the Agency has retained the endpoint of 1.1 mg/kg/day based on a NOAEL (No Observed Adverse Effect Level) from a chronic feeding study in rats which has been coupled with a 10 percent dermal absorption factor for risk assessment. In earlier assessments, the endpoint from the chronic toxicity study in rats (NOAEL 1.1 mg/kg/day) was used in all risk assessments in conjunction with a 10 percent dermal absorption factor. It should be noted that even though the Agency has calculated intermediate-term risks for durations >30 days, the available use data and the projected use patterns of phosmet do not indicate this is an extremely likely exposure scenario.

- Inhalation risks in this assessment are calculated using oral administration studies. In the previous assessment, the endpoint for both short- and intermediate-term risk assessments was selected from an oral administration chronic toxicity study in rats (NOAEL 1.1 mg/kg/day) in conjunction with a 100 percent absorption factor. In this assessment, for short-term inhalation exposures, the Agency has selected an endpoint of 4.5 mg/kg/day based on a

NOAEL (No Observed Adverse Effect Level) from a rat acute neurotoxicity study in conjunction with a 100 percent absorption factor. For intermediate-term inhalation exposures (exposure durations≤ 30 days), the Agency has selected an endpoint of 1.5 mg/kg/day based on a NOAEL (No Observed Adverse Effect Level) from a rat subchronic neurotoxicity study at 3 weeks duration in conjunction with a 100 percent absorption factor. For intermediate-term exposures (exposure durations > 30 days), the Agency has retained the endpoint of 1.1 mg/kg/day based on a NOAEL (No Observed Adverse Effect Level) from the chronic rat study.

- Nondietary ingestion risks in this assessment were calculated using an endpoint of 4.5 mg/kg/day based on a NOAEL (No Observed Adverse Effect Level) from an oral administration rat acute neurotoxicity study. This is the same endpoint that has been selected as the basis for the acute PAD (Population-Adjusted Dose for dietary risk assessment). These risks were combined with the dermal risks using an Agency method for aggregating exposures as appropriate. The use of this endpoint is based on single event exposures (i.e., the risks represented are from sporadic events). If exposures are considered to be more consistent or intermediate-term in nature (i.e., they are not sporadic but occur routinely over time), the risks would be calculated with the endpoint from the chronic rat feeding study (1.1 mg/kg/day) which was also used for the chronic PAD. In this assessment, the cPAD endpoint was not used because the nondietary ingestion risks for all scenarios considered were above the Agency's level of concern when the aPAD value was used.

- Inconsistencies in unit exposure values and exposure scenarios noted in the previous risk assessment for handlers, were corrected. The 1998 risk assessment considered handler exposures using three different levels of personal protection including: baseline (applicators wearing long-pants and long-sleeved shirt); using maximum PPE (applicators at baseline with coveralls, gloves, and a respirator); and with the use of engineering controls (e.g., closed cabs, etc.). In this assessment, additional levels of personal protection were considered ranging from a baseline level of protection through the use of engineering controls in every aspect of the application process. Phosmet labels typically require the use of long-pants, long-sleeved shirts, gloves, and respiratory protection (dust/mist PF 5 masks).

- Preliminary study results pertaining to children's exposure to pets generated by Dr. Janice Chambers of Mississippi State University were used for risk characterization purposes.

- The handler risk assessment completed by Dr. Douglas Baugher for the Gowan Corporation is acknowledged here but not considered in the Agency's document because it was calculated using different toxicity endpoints.

- The post-application probabilistic risk assessment completed by Dr. Douglas Baugher for the Gowan Corporation is acknowledged here but not considered in the Agency's document because the Agency is currently in the process of developing policies for assessing probabilistic assessments.

2. OCCUPATIONAL AND RESIDENTIAL EXPOSURE/RISK ASSESSMENT AND CHARACTERIZATION

This document addresses the exposures and risks associated with the use of the organophosphate insecticide, phosmet, that occur through non-dietary exposure. These exposures can occur as a result of applying phosmet or by entering areas that have been previously treated with phosmet. This chapter does not address possible phosmet exposures that occur through dietary intake of foods and water. Exposures can occur as a part of a job or through uses of phosmet around residences, on pets, and in other areas that are frequented by the general public. Occupational and residential exposures are addressed separately in this document.

Risk is defined in the *U.S. EPA Guidelines for Exposure Assessment* (U.S. EPA, Federal Register Volume 57, Number 104, Friday May 29, 1992) as the probability of deleterious health or environmental effects. *Risk assessment* can be described as the process that defines the *risk.* The *risk assessment* process has four major components including: exposure assessment, hazard identification, evaluation of the dose response, and characterization of the calculated risk values. This document addresses the exposure assessment and risk characterization aspects of the process. The hazard identification and evaluation of dose response are addressed in separate documents.

Use patterns and available products are summarized in a manner appropriate for nondietary risk assessment in *Section 2a: Use Pattern and Available Product Summary For Exposure Assessment.* The exposure/risk assessments that have been completed for each handler and postapplication scenario, for which appropriate data exist, are included in *Section 2b: Occupational and Residential Exposure/Risk Assessment.* The characterization issues associated with, and a summary of the results of each assessment, are included in *Section 2c: Occupational and Residential Risk Characterization*.

a. Use Pattern and Available Product Summary For Exposure Assessment

Phosmet products are described in this section. Additionally, available information that describes the manner in which phosmet products are applied is provided in this section (e.g., use categories/sites, application methods, and application rates). This section specifically includes a decription of the available products that contain phosmet (*Section 2.a.i: Manufacturing- and End-Use Products*); the mode of action of phosmet and the pests that it is labeled to control *(Section 2.a.ii: Mode of Action and Targets Controlled*); a description of the crops/groupings and other areas on which phosmet can be used *(Section 2.a.iii: Registered Use Categories and Sites*); and a description of the manner in which phosmet can be applied (*Section 2.a.iv: Application Parameters*). All uses that have been deleted at this point will no longer be considered in this assessment (also see below for further information -- pet collars are an example).

i. Manufacturing- and End-Use Products

Phosmet [N-(mercaptomethyl) phthalimide S-(0, 0-dimethyl phosphorodithioate)], is an organophosphate insecticide that is marketed in a variety of end-use products. Phosmet formulations include dusts, soluble concentrates, emulsifiable concentrates, wettable powders. Based on a review (7/7/99) of the *Office of Pesticide Programs -- Reference Files System(REFS),* there are 79 active product labels. The distribution of these labels is as follows: 2 technical products, 15 Section 3 labels for end-use products, and 62 State and Local Need (SLN or 24C) labels. The following table

summarizes all active Section 3 labels (SLN labels are not summarized for clarity and because they contain use patterns that are already reflected in the assessment for the Section 3 labels as previously noted):

Formulation Type	Percent Active Ingredient	EPA Reg. Numbers
Technical Grade	94	10163-172, 10163-227
Dusts	5	10163-168, 28293-015
Emulsifiable Concentrates	11.7*, 27.5#	773-076, 2724-169, 2724-262, 10163-171, 10163-173, 10163-215
Soluble Concentrate	12.4*	10163-174
Wettable Powder	12.5, 50, 70	10163-166, 10163-167, 10163-169, 10163-170, 10163-175, 10163-184

* = approximately 1 pound of active ingredient/gallon
# = approximately 2 pounds of active ingredient/gallon

Phosmet products are marketed for both occupational and homeowner uses. Occupational products are intended for use in the following markets: agriculture, ornamentals, direct-animal treatments, and professional uses in residential environments (or other areas where the general population can be exposed). Products intended for homeowner uses include products intended for: direct animal treatments, application to ornamentals, and applications to vegetable gardens.

ii. Mode of Action and Targets Controlled

Phosmet is an organophosphate insecticide used for the control of many types of pests including:

- **On Orchard & Fruit Crops:** apple maggot, oriental fruit moth, Japanese beetle, grape berry moth;
- **On Terrestrial Food & Feed Crops:** alfalfa weevil larvae, pea aphids, boll weevil, and potato weevil;
- **In Non-food Residential Settings:** gypsy moth, elm leaf beetle, Japanese beetle, fire ant; and
- **For Direct Animal Treatments:** fleas, lice, hornflies, sarcoptic mange, and ticks.

iii. Registered Use Categories and Sites

An analysis of current phosmet uses was completed using available labels, the *Office of*

Pesticide Programs -- Label Use Information System, REFS, and the recent *Quantitative Usage Analysis*. Phosmet is registered for use in a variety of occupational and homeowner/residential scenarios. For reasons of clarity in the risk assessment, the use patterns have been described in a manner that delineates the occupational from homeowner uses of phosmet.

Occupational Use Sites Occupational populations are potentially exposed while making phosmet applications in agriculture, during direct animal treatments, and while treating ornamentals. Exposures can also occur as a result of entering previously treated areas and performing a task that can lead to exposure such as harvesting. Exposures can occur during application or after contact with the following:

In Agriculture, Terrestrial Crops Include:

- **Fruit Tree and Nut Tree Crops:** almond, apricot, beech nut, butternut, cashew, cherry, chestnut, citrus fruits, crabapple, filbert, grapefruit, hickory nut, kiwi fruit, lemon, macadamia nut, nectarine, orange, peach, pear, pecan, pistachio, plum, prune, and walnut;
- **Grapes**;
- **Field, Forage, Fiber, Small Fruit (i.e., blueberries), and Vegetable Crops:** alfalfa, cotton, peas (fresh and dry), potatoes, and blueberries; and
- **Sweet Potatoes:** only storage dust application.

Direct Animal Treatment Sites Include:

- **Cattle:** dairy, beef, range, and feeder cattle;
- **Farm animals:** swine and cattle (dairy beef, range, & feeder); and
- **Pets:** dogs.

Ornamental/Forestry & Residential Use Sites Include:

- **NonCrop Areas:** field perimeters, parks, and recreation areas;
- **Evergreens in Large Stands:** Christmas tree plantations, various types of pine-tree forests;
- **Ornamentals:** deciduous shade trees, flowering trees and shrubs, evergreens, fire ant mounds, and roses; and
- **Pine seedlings:** nursery propogation.

Homeowner/Residential Use Sites Residential (non-occupational) exposures can occur as a result of phosmet being used in residential settings and other areas frequented by the general public. Exposures can occur in residential settings because homeowners can purchase phosmet containing

products and make applications. Exposures can also occur in a residential setting because individuals (e.g., children) can enter areas that were previously treated by homeowners (e.g., exposure to pets during or after animal treatments, uses on ornamentals and fruit trees) or that were previously treated by occupational applicators (e.g., insecticide use to control pests on trees, shrubs, and other ornamentals). Occupational uses at other sites frequented by the general public can also contribute to residential exposures including: ornamentals in parks and recreational areas; Christmas-tree farms; and pine forests. The crops/targets that can be treated by homeowners include:

- **Fruits and Nuts**: apples, pears, peaches, blueberries, almonds, and pecans;
- **Vegetables:** peas (fresh and dry) and potatoes;
- **Ornamentals:** shade trees, evergreens, fire ant mounds, and roses; and
- **Pets:** dogs.

iv. Application Parameters

Application Parameters is a generic term that describes the factors that are considered in the development of a risk assessment in relation to how a chemical is applied, how much is applied, and how often it is applied. These parameters are generally defined by the physical nature of the use site, how a product is formulated (e.g., form and packaging), by the equipment used to make the application, and by the application rate required by the label. Phosmet is a broadspectrum insecticide and it can be used in a variety of markets. Therefore, the application parameters are quite varied. These parameters are presented below for each major market and specific crop/target (e.g., application rates and the equipment that can be used to make applications).

Agricultural, Terrestrial Crops Treated Occupationally

- **Tree Fruit and Nut Crops:** The maximum application rate is 1.5 to 5.95 lb ai per acre depending upon the crop (i.e., fruit tree such as pears are at a maximum rate of 5 lb ai/acre, various nut trees are at 5.95 lb ai/acre, and apples ranging from 1.5 lb ai/acre on the east coast to 4 lb ai/acre on the west coast). Typical application rates range from 1.0 lb ai/acre for kiwi fruit to 3.1 lb ai/acre for walnuts. Tree fruit and nut crops also included in this range of application rates are apples, apricots, cherries, nectarines, peaches, pears, plums/prunes, almonds, and pecans. [Note: Citrus rates have been as high as 15 lb ai per acre. Citrus is not considered in this assessment as the Agency is anticipating that the use will be canceled. As such, any citrus use pattern considered in the previous risk assessments have been included here for informational purposes only because chemical-specific DFR data are available for citrus and they add to the characterization of the DFR results for other crops.] The formulations are wettable powders. Application equipment includes airblast, aerial, and chemigation. This summary is based on the revised QUA (Quantitative Usage Analysis) of 6/2/99 and the following labels: 10163-166 (open bag package), 10163-184 (water soluble package label), and 10163-175 (water soluble package label). The frequency of application is anticipated to be less than 5 times per year (most crops are less than 2 times per year) for each treated crop.

- **Grapes:** The maximum application rate is 1.5 lb ai per acre and the typical application rate is 1 lb ai/acre. Equipment for commercial use is airblast, over the row groundboom, aerial, and chemigation. The formulations are wettable powders. This summary is based on the revised QUA (Quantitative Usage Analysis) of 6/2/99 and the following labels: 10163-166 (open bag package), 10163-184 (water soluble package label), and 10163-175 (water soluble package label). The frequency of application is anticipated to be less than 5 times per year (most crops are less than 2 times per year) for each treated crop.

- **Field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels):** The maximum application rates ranges from 0.7 to 1 lb ai per acre depending on crop and formulation. Typical application rates range from 0.4 lb ai per acre for cotton and 0.5 lb ai per acre for green peas up to the maximum allowable application rates for various crops (e.g., 0.7 lb ai per acre for alfalfa and 1 lb ai per acre for blueberries). Equipment for commercial use is airblast, groundboom, aerial, and chemigation. The formulations are wettable powders. This summary is based on the revised QUA (Quantitative Usage Analysis) of 6/2/99 and the following labels: 10163-166 (open bag package), 10163-184 (water soluble package label), and 10163-175 (water soluble package label). The frequency of application is anticipated to be less than 5 times per year (most crops are less than 2 times per year) for each treated crop.

- **Post-harvest dusts on Sweet Potatoes**: The application rate is 0.0125 lb ai per 50 pound bushel. Commercial dusting equipment is used for applications. Typical application rates were unavailable. The formulation is a 5 percent dust. This summary is based on the label 10163-168. The frequency of application is anticipated to be less than 5 times per year (most crops are less than 2 times per year) for each treated crop.

Direct Animal Occupational Treatment Sites

- **Farm animal spray**: The application rate is 0.4 to 2.0 lb ai per 100 gallons of spray (0.004 to 0.02 lb ai/gallon). Typical application rates were unavailable. Application equipment is low-pressure handwand, backpack sprayer, and high-pressure handwand sprayer. The formulations are emulsifiable concentrate liquids. This summary is based on the following labels: 2724-262 and 773-076. No data on the frequency of application were available.

- **Cattle backrubber:** The application rate is 1 lb ai per 50 gallons of fuel oil. Application equipment is backrubber, soak sack, or cloth. Typical application rates were unavailable. The formulations are emulsifiable concentrate liquids. This summary is based on the labels 2724-262 and 773-076. No data on the frequency of application were available.

- **Dog dust:** The application rate is 0.5 grams of formulated dust per kilogram of animal bodyweight. Typical application rates were unavailable. A range of dog body weights was considered in this assessment from 5 pounds for small dogs up through 120 pounds for larger dogs. Application equipment is shaker can. This summary is based on the label 28293-15. No data on the frequency of application were available.

- **Dog dip:** The application rate is 0.0076 lb ai/gallon of dip solution. Application equipment is a pet dipping tank. Typical application rates were unavailable. The formulation is an emulsifiable concentrate. This summary is based on the label 2724-169. No data on the frequency of application were available.

Ornamental/Forestry & Residential Use Sites Treated Occupationally

- **Non Crop areas (e.g., field perimeters):** The application rate is 1.5 to 2.0 lb ai per acre. Equipment is groundboom and aerial. [Note: Higher application rate on lower amount of acreage than other aerial scenarios equal less daily chemical used than the summarys for forestry and evergreens below, hence the other aerial scenarios serves as the basis for this assessment because they require the use of more chemical.] The groundboom application method has been assessed for this use pattern. Typical application rates were unavailable. The formulations are wettable powders and emulsifiable concentrates. This summary is based on the information contained in various wettable powder labels (e.g., 10163-166) and various emulsifiable concentrate labels (e.g., 10163-215). No data on the frequency of application were available.

- **Forestry & evergreens in large stands:** The application rate for commercial crops is 1 lb ai per acre. Typical application rates were not available. Equipment for commercial use is airblast, aerial, and high-pressure handwand. The label specifies several equipment types including compressed air sprayer, bucket-pump sprayer, slide-pump sprayer, small pump sprayer, and wheelbarrow sprayer. High pressure handwand exposure data were used by the Agency to assess each of the equipment types specified by the label since the Agency believes the exposures would be similar to that received from high pressure handwand use. The formulations are wettable powders and emulsifiable concentrates. This summary is based on the information contained in various wettable powder labels (e.g., 10163-166) and in various emulsifiable concentrate labels (e.g., 10163-215). No data on the frequency of application were available.

- **Ornamentals (including fire ant treatments):** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using an airblast sprayer and the emulsifiable

concentrate. The formulations are wettable powders and emulsifiable concentrates. Equipment for commercial use is low-pressure handwand, airblast, backpack, and high-pressure handwand. This summary is based on the information contained in various wettable powder labels (e.g., 10163-166) and various emulsifiable concentrate labels (e.g., 10163-171). No data on the frequency of application were available. Specialized fire ant control applications are also allowed using the soluble concentrate formulation (10163-174). The application rate is specified as a single "fireban packet for each square foot of mound" where each packet contains 32 grams of a 12.5 percent material (i.e., 4 grams or 0.009 pounds of active ingredient per ft^2 of mound in 2 gallons of water). Fire ant control applications can be completed by placing the packets directly over the mound and diluting with a hose or by mixing the packets in a bucket then pouring the resulting solutions onto mounds.

- **Pine seedling dip**. The application rate is 1.75 lb ai per 5 gallons of dip (5 gallons of dip treats 10,000 seedlings). Typical application rates are not available. Likely application method is dipping by hand into an open bucket. This summary is based on the information the following labels: 10163-184, 10163-169, 10163-175, 1163-167, and 10163-166. No data on the frequency of application are available. The formulations are wettable powders and emulsifiable concentrates.

Homeowner Application Residential Use Sites

- **Fruits and nuts:** The application rate for homeowner crops is 0.0098 lb ai per gallon and 10 gallons of water per tree. Application equipment for homeowner includes backpack sprayers, low pressure handwand sprayers, hose-end sprayers, compressed air sprayers, and small power sprayers. Typical application rates were not available. The formulation is a wettable powder (10163-170). No data on the frequency of application were available.

- **Vegetables (peas and/or potatoes):** The application rate is 0.012 lb ai per 100 square feet. Application equipment for homeowner includes backpack sprayers, low pressure handwand sprayers, and hose-end sprayers (10163-170). Typical application rates are not available. The formulation is a wettable powder (10163-170). No data on the frequency of application are available.

- **Ornamentals (including fire ants):** The application rate for homeowner crops is 0.0075 lb ai per gallon (6 tsp of one pound per gallon formulation per gallon of water) using an emulsifiable concentrate formulation (10163-171) and 0.01 lb ai per gallon (3 Tbsp of 12.5% WP formulation per gallon of water) using a wettable powder formulation (10163-170). Equipment for homeowner includes backpack sprayers, low pressure handwand sprayers, hose-end sprayers, compressed air sprayers, and small power sprayers -- monitoring data for low pressure handwands, backpack sprayers, and hose-end sprayers have been used to complete this assessment. No data on the frequency of application are available. Fire ant control applications are also allowed using the soluble concentrate formulation (10163-174). The application rate is specified as a single "fireban packet for each square foot of mound" where each packet contains 32 grams of a 12.5 percent material (i.e., 4 grams or 0.009 pounds of active ingredient per ft^2 of mound). Fire ant control applications can be completed by placing the packets directly over the mound and diluting with a hose or by mixing the

packets in a bucket then pouring them onto the mound.

- **Dog dust:** The application rate is 0.5 grams of formulated dust per kilogram of animal bodyweight. Typical application rates are unavailable. A range of dog body weights is considered in this assessment from 5 pounds for small dogs through 120 pounds for larger dogs. Application equipment is shaker can or some similar device (28293-15). No data on the frequency of application are available.

- **Dog dip:** The application rate is 0.0076 lb ai/gallon of dip solution. Application equipment is a pet dipping tank. Typical application rates were unavailable. The formulation is an emulsifiable concentrate (2724-169). No data on the frequency of application were available.

[Note: This document is a revised version of the ORE Aspects of the Reregistration Eligibility Document for phosmet completed on May 12, 1998. Since that document was completed, several uses have been deleted. As a result, those uses have been removed from the current assessment. The deleted uses include: dip vat uses for food animals (e.g., cattle), cattle dust bags, any referenced treatments of cats, and dog collars. The separate helicopter applicator exposure scenario included in the previous document was also integrated into the assessment for fixed-wing aerial applications per current Agency policy. Two uses also exist on the current technical label that are not included in this assessment because the Agency is anticipating they will be canceled (i.e., sweet corn at an application rate of 0.5 lb ai/acre and citrus at an application rate of 15 lb ai/acre). The citrus DFR data have been retained in this assessment to aid in the risk characterization process.]

b. Occupational and Residential Exposure/Risk Assessment

The Agency has determined that there is a potential for exposure in both occupational and residential/homeowner scenarios from handling phosmet products during the application process (i.e., mixer/loaders, applicators, flaggers, and mixer/loader/applicators) and from entering areas previously treated with phosmet. As a result, risk assessments have been completed for both occupational handler and postapplication scenarios as well as residential handler and postapplication scenarios. The exposure and risk assessments that have been completed are described in this section. All risk assessments are structured based on the toxicity of the chemical being considered. The toxicological endpoints that have been selected for phosmet are included in *Section 2.b.i: Toxicity Endpoints Used in the Exposure/Risk Assessment*. This assessment considers exposures to individuals during the application process (referred to as handlers) and also after application. A description of both the occupational and residential handler exposure scenarios that serve as the basis for this assessment are presented in *Section 2.b.ii: Handler Exposure Scenarios*. The mechanics of how the handler risk assessment was completed and the data used in that assessment are presented in *Section 2.b.iii: Handler Exposure and Risk Assessment*. A description of both the occupational and residential post-application exposure scenarios that serve as the basis for this assessment are presented in *Section 2.b.iv: Post-Application Exposure Scenarios*. The mechanics of how the post-application risk assessment was completed and the data used in that assessment are presented in *Section 2.b.v: Post-Application Exposure and Risk Assessment*.

i. Toxicity Endpoints Used in the Exposure/Risk Assessment

A series of toxicological endpoints were used to complete the handler and post-application risk assessments. The endpoints that were used to complete this assessment are summarized below (by applicable route and duration) in order to provide a quick reference to the occupational and residential risk assessments. The toxic effect associated with all phosmet endpoints is red blood cell and plasma cholinesterase inhibition.

- **Short-Term Dermal:** 15 mg/kg/day based on a NOAEL from a 21 dermal toxicity study in rats (MRID 44795801);

- **Intermediate-Term Dermal (exposure durations ≤30 days):** 15 mg/kg/day based on a NOAEL from a 21 dermal toxicity study in rats (MRID 44795801);

- **Intermediate-Term Dermal (exposure durations >30 days):** 1.1 mg/kg/day based on a NOAEL from a chronic feeding study in rats (MRID 41916401);

- **Dermal Absorption:** 10 percent based on rat dermal absorption study (MRID 40122201);

- **Short-Term Inhalation:** 4.5 mg/kg/day based on a NOAEL from an acute neurotoxicity study in rats (MRID 44673301);

- **Intermediate-Term Inhalation (exposure durations≤ 30 days):** 1.5 mg/kg/day based on a NOAEL at 3 weeks from a subchronic neurotoxicity study in rats (MRID 44811801);

- **Intermediate-Term Inhalation (exposure durations > 30 days):** 1.1 mg/kg/day based on a NOAEL from a chronic feeding study in rats (MRID 41916401);

- **Non-dietary Ingestion:** 4.5 mg/kg/day based on a NOAEL from an acute neurotoxicity study in rats (MRID 44673301) which was used for the development of the aPAD, intermediate-term nondietary ingestion exposures were also characterized using the NOAEL of 1.1 mg/kg/day based on the chronic feeding study in rats (MRID 41916401);

- **Uncertainty Factors Applied to Occupational Assessments:** 100 for all short-term and intermediate-term scenarios;

- **Uncertainty Factors Applied to Homeowner/Residential Assessments:**100 for all short-term and intermediate-term scenarios; and

- **Cancer:** Quantitative calculation of cancer risks is not applicable.

ii. Handler Exposure Scenarios

Exposure scenarios can be thought of as ways of categorizing the kinds of exposures that occur related to the use of a chemical. The use of scenarios as a basis for exposure assessment is very common as described in the *U.S. EPA Guidelines For Exposure Assessment* (U.S. EPA; Federal Register Volume 57, Number 104; May 29, 1992). The purpose of this section is to describe the exposure scenarios that were used by the Agency in the assessment for phosmet handlers and to

explain how the scenarios were defined. Information from the current labels; use and usage information; toxicology data; and exposure data were all key components in the developing the exposure scenarios.

The Agency uses the term "Handlers" to describe those individuals who are involved in the pesticide application process. The agency believes that there are distinct job functions or tasks related to applications and that exposures can vary depending on the specifics of each task. Job requirements (e.g., amount of chemical to be used in an application), the kinds of equipment used, the crop or target being treated, and the circumstances of the user (e.g., the level of protection used by an applicator) can cause exposure levels to differ in a manner specific to each scenario.

The Agency uses a concept known as *unit exposure* as the basis for the scenarios used to assess handler exposures to pesticides. *Unit exposures* numerically represent the exposures one would receive related to an application. They are generally presented as (mg active ingredient exposure/pounds of active ingredient handled). The Agency has developed a series of unit exposures that are unique for each scenario typically considered in our assessments (i.e., there are different unit exposures for different types of application equipment; job functions; and levels of protection). The *unit exposure* concept has been established in the scientific literature and also through various exposure monitoring guidelines published by the U.S. EPA and international organizations such as Health Canada and OECD (Organization For Economic Cooperation and Development). The concept of unit exposures can be illustrated by the following example. If an individual makes an application using a groundboom sprayer with either 10 pounds of chemical A or 10 pounds of chemical B using the same application equipment and protective measures, the exposures to chemicals A and B would be similar. The unit exposure in both cases would be 1/10th of the total exposure (measured in milligrams) received during the application of either chemical A or chemical B (i.e., milligrams on the skin after applying 10 pounds of active ingredient divided by 10 pounds of active ingredient applied).

Types of Exposures The first step in the handler risk assessment process is to identify the kinds of individuals that are likely to be exposed to phosmet during the application process. In order to do this in a consistent manner, the Agency has developed a series of general descriptions for tasks that are associated with pesticide applications. Common tasks (as an example) can include: preparation of dilute, water-based spray solutions for application; transfering or loading dilute spray solutions into sprayers for application; and making applications with specific types of equipment such as a groundboom or airblast sprayer. The Agency also considers whether or not individuals use

pesticides as part of their employment (referred to as occupational risk assessments) or if they are individuals who purchase and use pesticide products in and around their residences (referred to as homeowners). Tasks associated with pesticide use (i.e., for "handlers") can generally be categorized using one of the following terms:

- **Occupational Mixer/loaders:** these individuals perform tasks in preparation for an application. For example, they would prepare dilute spray solutions and/or load/transfer solid materials (e.g., granulars) or dilute spray solutions into application equipment such as a groundboom tractor or planter prior to application.

- **Occupational Applicators:** these individuals operate application equipment during the release of a pesticide product into the environment. These individuals can make applications using equipment such as groundboom sprayers or tractor-drawn spreaders for granular materials.

- **Occupational Mixer/loader/applicators:** these individuals are involved in the entire pesticide application process (i.e., they do all job functions related to a pesticide application event). These individuals would prepare a dilute spray solution and then also apply the solution. The Agency always considers some exposures to be mixer/loader/applicator exposures because of the equipment used and the logistics associated with such applications. For example, if one uses a small handheld device such as a 1 gallon low pressure handwand sprayer it is anticipated that one individual will mix a spray solution and then apply the solution because of labor and logistical considerations.

- **Occupational Flaggers:** these individuals guide aerial applicators during the release of a pesticide product onto an intended target.

- **Homeowner Mixer/loader/applicators:** these individuals are involved in the entire pesticide application process (i.e., they do all job functions related to a pesticide application event). These individuals would prepare a dilute spray solution and then also apply the solution. The Agency always considers some exposures to be mixer/loader/applicator exposures because of the equipment used. For example, if one uses a small handheld device such as a low pressure handwand sprayer then it is anticipated that one individual will mix a spray solution and then apply the solution. This category also encompasses all homeowner applications. The only significant difference between this category and the similar occupational category is that the individuals typically use less chemical on a daily basis and the available levels of personal protection (see below) that are also used to define exposure scenarios are limited and generally less protective.

There are individuals who use phosmet that fit into each of the job function categories described above. Therefore, the phosmet risk assessment for handlers contains exposure scenarios in each category.

Use Patterns & Tasks The next step in the risk assessment process is to define what kinds of equipment, packaging, and formulation types (as well as other kinds of factors that can vary in specific assessments) can be used by individuals when making phosmet applications. In agriculture (not including animal treatments), phosmet can be used occupationally to treat a variety of tree fruits and nuts; grapes; field and vegetable crops including alfalfa, cotton, blueberries, sweet potatoes, peas and potatoes. Most applications of phosmet in agriculture (not involving animal treatments) involve wettable powders that are diluted in water and applied as a spray. There is also a sweet potato dust treatment that is completed after harvest. Phosmet labels do not specify all particular types of application equipment for these crops as is common for most pesticide labels. Therefore, in order to complete exposure assessments for handlers, the Agency must evaluate what crops and other targets can be treated and then determine what application methods are likely to be used to make an application. It is expected that phosmet applications are routinely made with equipment that is common in agriculture including groundboom sprayers, airblast sprayers, fixed-wing aircraft (also representing helicopters for the purposes of this assessment), and chemigation (i.e., irrigation) equipment. The sweet potato dust treatments, completed after harvest, are intended to maintain the integrity of the crop during storage. The exact nature of those application equipment/processes is not known to the Agency.

Phosmet can be also be occupationally applied to animals in agriculture (cattle and swine) and for veterinary reasons (dogs only) in order to control a variety of pests. Phosmet can be occupationally applied to animals in agriculture (cattle and swine) as a dilute spray prepared using a liquid emulsifiable concentrate formulation. A suite of application methods are selected for risk assessment purposes by the Agency when uses on animals are identified because many types of application equipment are available and no application method is specified or precluded on the current labels. Therefore, handlers can use their own discretion to select and use any functional method to make an application. To ensure that the potential risks associated with the use of phosmet are addressed it is necessary to evaluate all potential application methods in the assessment. The suite of application methods selected by the Agency for this risk assessment includes handheld sprayers for dilute liquid sprays such as low pressure handwands, backpack sprayers, or high pressure handwand sprayers. Applications to cattle can also be made using a backrubber device that is charged with phosmet and placed in an animal holding area. Backrubbers are devices that are essentially soaked with fuel oil and pesticide and then placed where cattle can rub their backs on them for pest control purposes. Dogs can also be treated in a veterinary setting using dusts and by dipping in a water-based solution. Dust applications to dogs are completed using packaging suited for that purpose (e.g., a shaker can). Dipping involves the dilution of emulsifiable concentrate formulations of phosmet with water in a device suited for bathing animals and then completing the bathing process.

Phosmet can be occupationally applied in forestry or to established ornamentals (including large trees in public places -- tree surgeon uses) as a dilute spray prepared using a liquid emulsifiable concentrate formulation. A soluble concentrate can also be used only for fire ant control. A suite of application methods are selected for risk assessment purposes by the Agency when uses on ornamentals are identified because many types of application equipment are available and no application method is specified or precluded on the current labels. Therefore, handlers can use their own discretion to select and use any functional method to make an application. To ensure that the potential risks associated with the use of phosmet are addressed it is necessary to evaluate all

potential application methods in the assessment. The suite of application methods selected by the Agency for this risk assessment includes large-scale airblast-like equipment for stands of trees or tree surgeon uses; aerial application equipment for stands of trees; and handheld sprayers for dilute liquid sprays such as low pressure handwands, backpack sprayers, or high pressure handwand sprayers. Fire ant treatments can be made with the soluble concentrate formulation using two techniques including the preparation of a dilute solution in a bucket or sprinkler can and pouring directly onto the mound or by placing packets directly on the mounds and diluting them with a hose.

Homeowners can also make a variety of phosmet applications to pets, ornamentals, fire ant mounds, vegetables, and fruit trees. The application methods for treating pets depends on the formulation. Dusts and dips are anticipated by the Agency to be applied in a manner that is similar to the occupational application methods (i.e., dilution of an emulsifiable concentrate for bathing or shaker can). Likewise, the fire ant mound applications are anticipated to be similar for homeowners and occupational applicators with addition of the packets to the mound and dilution by hose or preparation of a dilute solution and addition to the ant mound. A suite of application methods are selected for risk assessment purposes by the Agency when homeowner uses on ornamentals, vegetable gardens, and trees (e.g., fruit trees) are identified because many types of application equipment are available and no application method is specified or precluded on the current labels. Therefore, handlers can use their own discretion to select and use any functional method to make an application. To ensure that the potential risks associated with the use of phosmet are addressed it is necessary to evaluate all potential application methods in the assessment. The suite of application methods selected by the Agency for this risk assessment includes handheld sprayers for dilute liquid sprays such as low pressure handwands, backpack sprayers, or hose-end sprayers.

Exposure Patterns & Toxicity Next, assessors must understand how exposures to phosmet occur (i.e., frequency and duration) and how the patterns of these occurences can cause the effects of the chemical to differ (referred to as dose response). Wherever possible, use and usage data determine the appropriateness of certain types of risk assessments (e.g., a chronic risk assessment is not warranted for phosmet because chronic duration exposure patterns do not occur). Other parameters are also defined from use and usage data such as application rates and application frequency. The Agency always completes risk assessments using maximum application rates for each scenario because what is possible under the label (the legal means of controlling pesticide use) must be evaluated, for complete stewardship, in order to ensure there are no concerns for each specific use. Additionally, whenever the Agency has additional information such as typical application rates for some crops, as in this case, it uses the information to further evaluate the overall risks associated with the use of the chemical in order to allow for a more informed risk management decision. In this case, average application rates (considered to be the same as typical rates for the purposes of this assessment) defined in the recent *Quantitative Usage Analysis* were available for some crops and integrated into the assessment.

A chemical can produce different effects based on how long a person is exposed, how frequently exposures occur, and the level of exposure. It is likely that phosmet exposures can occur in a variety of patterns. The Agency believes that occupational phosmet exposures can occur over a single day or up to weeks at a time even though each crop or application target is generally treated only once or twice per season. Intermittent exposures over several weeks are also anticipated. Some applicators may apply phosmet over a period of weeks because they need to cover large acreages,

they may be custom or professional applicators that are completing a number of applications within a region, or they may be applying phosmet over a period of several days (e.g., a veterinary assistant who dips dogs periodically over a period of several weeks). The Agency classifies exposures of one week or less as short-term exposures and exposures of 1 week to several months as intermediate-term exposures. The Agency completes both short- and intermediate-term assessments for occupational scenarios in essentially all cases because these kinds of exposures are likely and acceptable use and usage data are not available to justify deleting some intermediate-term scenarios. For phosmet, the agency has completed a short-term assessment and two types of intermediate-term assessments because of toxicity profile of phosmet and concerns over extended periods of exposure for a small segment of the user population. One set of intermediate-term endpoints is applicable to exposures that range in duration from 7 to 30 days and the other set is applicable to exposures that range in duration from 30 days to several months. As a result, three risk assessments have been completed for the occupational uses of phosmet including for short-term durations, intermediate-term durations less than 30 days, and intermediate-term durations greater than 30 days. Long-term or chronic exposures (essentially every working day over a year) can also occur for some chemicals. No long-term exposures are associated with the use of phosmet. Homeowner applicator scearnios are always considered short-term in nature as these applications are anticipated to be sporadic in nature (i.e., no intermediate-term exposures are anticipated for homeowner applicators).

The toxicity of chemicals can also vary based on the route of exposure or how a chemical enters the body. For example, exposures to the skin can result in a different toxic effect and/or severity of reaction than exposures via inhalation. The effects of a chemical can also vary for different durations of exposure. The toxicology database for phosmet indicates that the Agency consider short- and intermediate-term (durations $\leq$ 30 days) exposures to the skin separately from exposures via inhalation because the effects and the dose levels at which effects occur differ based on whether it is deposited on the skin or it is inhaled (e.g., endpoints selected from 21 day dermal study and acute neurotoxicity study for inhalation were used for the short-term risk assessment). For intermediate-term exposures greater than 30 days, the Agency believes that the duration of exposure is a more critical factor based on the timing of effects identified in the available toxicity studies. As such, a different endpoint was selected from an oral administration chronic feeding study to assess intermediate-term exposures longer than 30 days in duration. This endpoint has been applied to both exposures to the skin and via inhalation. [Note: For further information regarding the toxicity endpoints, see *Section 2.b.i: Toxicity Endpoints Used in the Exposure/Risk Assessment*.]

Levels of Personal Protection Occupational handler exposure assessments are completed by the Agency using different levels of personal protection. The Agency typically evaluates all exposures with minimal protection and then adds additional protective measures using a tiered approach to obtain an appropriate MOE or until all options are exhausted and the risks still exceed the Agency's level of concern (i.e., going from minimal to maximum levels of protection). The lowest tier is represented by the baseline exposure scenario followed by increasing the levels of personal protection represented by personal protective equipment or PPE (e.g., gloves, extra clothing, and respirators) and engineering controls (e.g., closed cabs and closed loading systems). This approach is always used by the Agency in order to be able to define label language using a risk-based approach and not based on generic requirements for label language. [Note: Current labels mostly require single layer clothing, chemical-resistant gloves, and dust/mist (PF5) respirators.] In addition, the minimal level of adequate protection for a chemical is generally considered by the

Agency to be the most practical option for risk reduction (i.e., over-burdensome risk mitigation measures are not considered a practical alternative for regulatory action). For phosmet, four distinct levels of dermal protection were considered in the assessment to account for the use of standard work clothing (long-pants and long-sleeved shirt), standard work clothing with a pair of gloves, standard work clothing with a pair of chemical-resistant gloves and an additional layer of clothing such as coveralls, and the use of engineering controls. Additionally, four levels of respiratory protection were considered in the assessment to account for no respiratory protection, the use of dust/mist PF 5 and organic vapor removing PF 10 respirators (PF = protection factor), and the use of engineering controls. [Note: The manner in which these calculations have been completed allow for flexibility in determining final protective measures -- see Section 2.c for further details.] The levels of protection that formed the basis for the calculations in this assessment include:

- **Baseline:** Represents typical work clothing or a long-sleeved shirt and long pants with no respiratory protection. No chemical-resistant gloves are included in this scenario.

- **Minimum Personal Protective Equipment (PPE):** Represents the baseline scenario with the use of chemical-resistant gloves and a dust/mist respirator with a protection factor of 5.

- **Maximum Personal Protective Equipment (PPE):** Represents the baseline scenario with the use of an additional layer of clothing (e.g., a pair of coveralls), chemical-resistant gloves, and an air purifying respirator with a protection factor of 10.

- **Engineering Controls:** Represents the use of an appropriate engineering control such as a closed tractor cab or closed loading system for granulars or liquids. Engineering controls are not applicable to handheld application methods which have no known devices that can be used to routinely lower the exposures for these methods.

The premise used by the Agency in homeowner handler assessments is that a tiered mitigation approach is inappropriate because homeowners generally lack access to protective equipment and also lack the appropriate training for proper use. As a result, homeowner handler assessments are completed using a single scenario based on the use of short-sleeved shirts and short pants (i.e., common homeowner attire during the pesticide application season).

Specific Exposure Scenarios Given all of the information above, the scenarios that have been developed for each specific occupational use of phosmet include (the scenario numbers correspond to the tables of risk calculations included in the occupational risk calculation aspects of the appendices):

<u>For Occupational Uses In Agriculture on Terrestrial Crops/Targets (*+):</u>

(2a) mixing/loading wettable powders for aerial and chemigation application;
(2b) mixing/loading wettable powders for groundboom applications;
(2c) mixing/loading wettable powders for airblast applications;
(3) applying sprays with an airblast sprayer;
(4) applying sprays with a groundboom sprayer;
(5) applying sprays with a fixed-wing aircraft (also accounts for helicopter applications);
(9) applying with a power duster; and

(16) flagging for aerial spray application.

For Occupational Direct Animal Treatments (*+):

(1a) mixing/loading liquids for high pressure handwand application;
(6) applying sprays with a high-pressure handwand;
(10) dusting an animal (veterinary uses only);
(11) dipping a dog (veterinary uses only);
(12) mixing/loading/applying with a cattle backrubber;
(13a) mixing/loading/applying liquids with a backpack sprayer; and
(14a) mixing/loading/applying liquids with a low pressure handwand sprayer.

For Occupational Treatments on Ornamentals (including forestry) and Residential Use Sites (*+):

(1a) mixing/loading liquids for a high pressure handwand and right-of-way sprayer applications;
(1b) mixing/loading liquids for airblast applications;
(2a) mixing/loading wettable powders for aerial application;
(2b) mixing/loading wettable powders for groundboom applications;
(2c) mixing/loading wettable powders for airblast applications;
(2d) mixing/loading wettable powders for high pressure handwand and right-of-way sprayer applications;
(2e) mixing/loading wettable powders for pine seedling dips;
(3) applying sprays with an airblast sprayer;
(4) applying sprays with a groundboom sprayer;
(5) applying sprays with a fixed-wing aircraft (also accounts for helicopter applications);
(6) applying sprays with a high-pressure handwand;
(7) applying sprays with a right-of-way sprayer;
(8) dipping pine seedlings;
(13a) mixing/loading/applying liquids with a backpack sprayer;
(13b) mixing/loading/applying wettable powders with a backpack sprayer;
(14a) mixing/loading/applying liquids with a low pressure handwand sprayer;
(14b) mixing/loading/applying wettable powders with a low pressure handwand sprayer; and
(15) mixing/loading/applying soluble concentrates to fire ant mounds.

* assessed at each appropriate level of personal protection described above
+ assessed at typical (if available) and maximum application rate
# tiered approach for personal protection is not applicable

Given all of the information above, the scenarios that have been developed for each specific homeowner use of phosmet include (the scenario numbers correspond to the tables of risk calculations included in the residential (homeowner) risk calculation aspects of the appendices):

For Residential (homeowner) Direct Animal Treatments (*#):

(1) dusting an animal; and
(2) dipping a dog.

For Residential (homeowner) Uses on Terrestrial Crops (*#):

(3b) mixing/loading/applying wettable powders with a backpack sprayer;
(4b) mixing/loading/applying wettable powders with a low pressure handwand sprayer; and
(5b) mixing/loading/applying wettable powders with a hose-end sprayer.

For Residential (homeowner) Treatments on Ornamentals (*#):

(3a) mixing/loading/applying liquids with a backpack sprayer;
(3b) mixing/loading/applying wettable powders with a backpack sprayer;
(4a) mixing/loading/applying liquids with a low pressure handwand sprayer;
(4b) mixing/loading/applying wettable powders with a low pressure handwand sprayer;
(5a) mixing/loading/applying liquids with a hose-end sprayer;
(5b) mixing/loading/applying wettable powders with a hose-end sprayer; and
(6) mixing/loading/applying soluble concentrates to fire ant mounds.

+ assessed at typical (if available) and maximum application rate
# tiered approach for personal protection is not applicable

iii. *Handler Exposure and Risk Assessment*

The Agency considers how chemical exposures occur (the frequency and duration) and also how chemicals enter the body (because the toxic effects can be different), as described in Section 2.b.ii above, when developing risk assessments. To evaluate all of these types of risk concerns, the Agency has completed three distinct risk assessments for phosmet handlers including:

- Short-term Duration;
- Intermediate-term Duration (>7 but ≤30 days); and
- Intermediate-term Duration (>30 days).

Exposure levels are calculated in a manner that accounts for the method of application, the level of personal protection used during application, and the amount of chemical handled in an application (i.e., proportional to application rate and the amount treated per day). Both daily dermal and daily inhalation exposures have been calculated for each type of assessment completed. In some cases, risks were calculated individually for each route of exposure then added. In other cases, a total body burden (represented by total absorbed dose) was calculated. The toxicological effect of concern was the determining factor in the way that the exposures were calculated.

Algorithms In all cases, daily dermal exposure levels were calculated. Daily dermal exposure is generally calculated using the following formula:

Daily Dermal Exposure (mg ai/day) =

Unit Exposure (mg ai/lb ai) x Application Rate (lb ai/A) x Daily Acres Treated (A/day)

Where:

Daily Dermal Exposure = Amount deposited on the surface of the skin that is available for dermal absorption, also referred to as potential dose (mg ai/day);
Unit Exposure = Normalized exposure value derived from May 1997 PHED Surrogate Exposure Table and the December 1997 SOPs for Residential Exposure Assessment Surrogate Exposure Table for homeowner applications, no chemical-specific handler data were available for this assessment (mg ai/pound ai applied);
Application Rate = Normalized application rate based on a logical treatment unit such as acres or on a per animal basis, a maximum value is generally used (lb ai/A or lb ai/animal); and
Daily Acres Treated = Normalized application area based on a logical unit treatment such as acres or numbers of animals (A/day or animals/day).

[Note: In some cases, the above equation has been substituted by an algorithm excerpted from the Agency's *SOPs For Residential Exposure Assessment* (chapter 9) that calculates exposures based on the percent of active ingredient applied (e.g., see Pet Treatment calculations included in Appendices).]

Daily dermal dose (i.e., a biologically appropriate and available dose resulting from dermal exposure) was then calculated by normalizing the daily dermal exposure value by body weight and accounting for dermal absorption as appropriate. For adult handlers using phosmet, a body weight of 70 kg was used for all exposure scenarios because the toxic effect (cholinesterase inhibition) is not sex-specific. Additionally, a dermal absorption factor of 10 percent was used for all calculations when appropriate (i.e., calculation of internal dose levels for intermediate-term exposures > 30 days). Short-term and intermediate term ($\leq$30 days) dermal risks were calculated using a 21 day dermal toxicity study. As a result, the dermal absorption factor was not applied (but was set to 100 percent as no correction to the exposure value in the calculation is appropriate). Daily dermal dose was calculated using the following formula:

$$Daily\ Dose\left(\frac{mg\ ai}{kg/day}\right) = Daily\ Exposure\left(\frac{mg\ ai}{day}\right) x \left(\frac{AbsorptionFactor(\%/100)}{Body\ Weight\ (kg)}\right)$$

Where:

Daily Dose = the amount as potential dose (for the short- and intermediate-term dermal calculations) or absorbed dose (for inhalation or nondietary ingestion calculations) received from exposure to a pesticide in a given scenario (mg pesticide active ingredient/kg body weight/day);
Daily Exposure = the amount of dermal (on the skin), inhalation (inhaled), or nondietary ingestion (from mouthing behaviors of children) exposure calculated above (mg pesticide active ingredient/day);
Absorption Factor = a measure of the flux or amount of chemical that crosses a biological boundary (% of the total available); and
Body Weight = body weight determined to represent the population of interest in a risk assessment (kg).

[Note: The U.S. EPA Exposure Assessment Guidelines (EPA, 1992) define potential dose as the amount of a chemical at the absorption barrier. Additionally, absorbed dose is defined as the amount of a chemical that has been absorbed and is available for interaction with biologically significant receptors.]

The next step was to calculate the daily inhalation dose for handlers. The process used was similar to that used to calculate the daily dermal dose to handlers. Daily inhalation exposure levels were are presented as (g/lb ai) values in the *PHED Surrogate Exposure Table* of May 1997 or the December 1997 *SOPs for Residential Exposure Assessment Surrogate Exposure Table* for homeowner applications (i.e., these values are based on an inhalation rate of 29 liters/minute and an 8 hour exposure interval). Once the unit exposure value is presented in this form and converted to (mg/lb ai), the calculations essentially mirror those presented above for the dermal route using a value of 100 percent absorption (i.e., a daily inhalation dose is calculated in mg/kg/day).

The handler exposure assessments do not include any dietary or drinking water inputs. They also do not include any dose attributable to nondietary ingestion (e.g., hand-to-mouth activity).

Risks were calculated in a non-probabilistic manner using the Margin of Exposure (MOE) which is a ratio of the calculated exposure to the toxic endpoint of concern. Short-term total and intermediate-term (exposure durations $\leq$ 30 days) MOEs attributable to dermal exposure were calculated using the NOAEL from the 21 day dermal toxicity study and using the NOAEL from the chronic feeding study for exposures greater than 30 days, respectively. Likewise, MOEs were calculated for short- and intermediate-term (i.e., $\leq$30 and >30 days) inhalation exposure durations, respectively, using the endpoints selected from the acute, subchronic neurotoxicity, and chronic feeding studies. [Note: See Section 2.b.i for more details about the specific endpoints used in each assessment.] MOEs were calculated using the formula below:

$$MOE = \frac{Endpoint \left(\frac{mg}{kg/day} \right)}{Daily\ Dose \left(\frac{mg}{kg/day} \right)}$$

Where:

MOE = margin of exposure or value used by the Agency to represent risk or how close a chemical exposure is to being a concern (unitless);
Daily Dose = the amount as potential dose (for the dermal calculations) or absorbed dose (for inhalation or nondietary ingestion calculations) received from exposure to a pesticide in a given scenario (mg pesticide active ingredient/kg body weight/day); and
Endpoint = dose level in a toxicity study, where no observed adverse effects occur (NOAEL) in the study (mg pesticide active ingredient/kg body weight/day).

MOEs were added together in order to consider total risks to handler given that the toxic effect (cholinesterase inhibition in various compartments) for each route of exposure (e.g., to the skin and being inhaled) is the same. The equation the Agency uses to add MOEs together is presented below:

$$MOE_{total} = 1/((1/MOE_a) + (1/MOE_b) +.... (1/MOE_n))$$

Where:

MOE_a, MOE_b, and MOE_n represent MOEs for each exposure route of concern

A margin of exposure (MOE) uncertainty factor of 100 is considered an appropriate risk level for for all assessments completed regardless of whether the exposure is occupational or residential in nature.

Calculations & Results All occupational handler exposure and risk calculations are presented in the tables contained in *Appendix A: Occupational Handler Exposure and Risk Assessment For Phosmet.* Table 1 contains information that can be used to describe the exposure data used in the analysis. The origin of each unit exposure value is presented along with information pertaining to the quality of the data used to calculate each value. The assessment of data quality is based on the number of observations and the available quality control data. The quality control data are assessed based on Agency guidelines and a grading criteria established by the Pesticide Handlers Exposure Database task force. Other exposure factors (i.e., descriptions of each scenario, application rates, and acres treated), unit exposure values at varying levels of mitigation (such as personal protection), and toxicological parameters used in the risk assessments are presented in Table 2. The calculation of baseline exposures (mg/day), dose levels, and the resulting Margins of Exposure (MOEs) for short- and all intermediate-term exposures are presented in Table 3. Tables 4, 5, and 6 contain similar calculations for increased levels of personal protection. Values calculated for the use of additional mitigation in the form of minimum personal protective equipment are presented in Table 4 (single layer clothing with gloves and a PF 5 respirator) while values calculated for the use of additional mitigation in the form of maximum personal protective equipment (double layer clothing with gloves and a PF 10 respirator) are presented in Table 5. Table 6 contains values that reflect the use of appropriate engineering controls. Tables 7 through 12 in Appendix A present summary results of the risk assessment that are also discussed in more detail in the section 2.c of this document. [Note: The handler risk assessment completed by the Gowan Corporation is acknowledged here but not considered in the Agency's current assessment because the risk values calculated in the Gowan assessment are based on a different NOAEL than was selected by the Agency's HIARC Committee.]

All residential (homeowner) handler exposure and risk calculations are presented in the tables contained in *Appendix B: Residential (Homeowner) Handler Exposure and Risk Assessment For Phosmet.* Table 1 contains information that can be used to describe the data used in the analysis. The origin of each unit exposure value is presented along with information pertaining to the quality of the data used to calculate each value. The assessment of data quality is based on the number of observations and the available quality control data. The quality control data are assessed based on Agency guidelines and a grading criteria established by the Pesticide Handlers Exposure Database task force. The exposure factors (i.e., descriptions of each scenario, application rates, and acres

treated), unit exposure values, and toxicological parameters used in the risk assessments are presented in Table 2. The calculation of homeowner clothing scenario exposures (mg/day), dose levels, and the resulting Margins of Exposure (MOEs) for short-term exposures are presented in Table 3.

The factors described in the exposure calculation above are discussed below. These factors include: unit exposures; application rate; acres treated per day; and frequency of application.

Chemical-specific exposure data for pesticide handling activities were not submitted to the Agency in support of the reregistration of phosmet. It is the policy of the Agency to use data from the *Pesticide Handlers Exposure Database (PHED) Version 1.1* to assess handler exposures for regulatory actions when chemical-specific monitoring data are not available.

Pesticide Handlers Exposure Database PHED was designed by a task force of representatives from the U.S. EPA, Health Canada, the California Department of Pesticide regulation, and member companies of the American Crop Protection Association. PHED is a software system consisting of two parts -- a database of measured exposure values for workers involved in the handling of pesticides under actual field conditions and a set of computer algorithms used to subset and statistically summarize the selected data. Currently, the database contains values for over 1,700 monitored application events (i.e., referred to as replicates).

Users select criteria to subset the PHED database to reflect the exposure scenario being evaluated. The subsetting algorithms in PHED are based on the central assumption that the magnitude of handler exposures to pesticides are primarily a function of activity (e.g., mixing/loading, applying), formulation type (e.g., wettable powders, granulars), application method (e.g., aerial, groundboom), and clothing scenarios (e.g., gloves, double layer clothing).

Once the data for a given exposure scenario have been selected, the data are normalized (i.e., divided by) by the amount of pesticide handled resulting in standard unit exposures (milligrams of exposure per pound of active ingredient handled). Following normalization, the data are statistically summarized. The distribution of exposure values for each body part (e.g., chest upper arm) is categorized as normal, lognormal,or "other" (i.e., neither normal nor lognormal). A central tendency value is then selected from the distribution of the exposure values for each body part. These values are the arithmetic mean for normal distributions, the geometric mean for lognormal distributions, and the median for all "other" distributions. Once selected, the central tendency values for each body part are composited into a "best fit" exposure value representing the entire body. The unit exposure values calculated by PHED generally range from the geometric mean to the median of the selected data set. It should also be noted that distributional analyses of the data contained in PHED are not done for the risk assessment process because the available data do not currently lend themselves to this kind of analysis.

To add consistency to the values produced from this system and to ensure quality control, the PHED Task Force has evaluated all data within the system and has developed a set of grading criteria to characterize the quality of the original study data. The assessment of data quality is based on the number of observations and the available quality control data. These evaluation criteria and the caveats specific to each exposure scenario are summarized in Appendix A/Table 1 and in Appendix

B/Table 1. While data from PHED provide the best available information on handler exposures, it should be noted that some aspects of the included studies (e.g., duration, acres treated, pounds of active ingredient handled) may not accurately represent labeled uses in all cases. The Agency has developed a series of tables of standard unit exposure values (i.e., representing the "best fit" for each dataset) for many occupational scenarios that can be utilized to ensure consistency in exposure assessments.

Use and Usage Information In addition to PHED, the application rate and daily amount treated (usually acres per day) are also key elements in the calculation of handler exposures. A range of application rates, derived from phosmet labelling and the data from the QUA, serves as the basis for this assessment. Maximum application rates range from ≤1 to 5 pounds of active ingredient per acre in agricultural settings and from 1 to 2 pounds of active ingredient per acre on some ornamentals. In other cases where handheld equipment is used for direct animal treatments and treatments on ornamentals, rates can vary widely due to the *ad libitum* nature of the application method. For these application methods, the highest concentration allowed is 0.02 pounds of active ingredient per gallon and themaximum volume applied considered in this assessment is 1000 gallons (i.e., a total of 20 pounds of active ingredient applied). The recent QUA was used to establish average application rates for various agricultural crops. The range of average application rates calculated in this analysis ranged from less than 1 lb ai/acre up to about 3 lb ai/acre for walnuts. Wherever available, both maximum and average application rates are used in each assessment.

The amount treated per day, usually expressed as the number of acres treated per day, is another critical factor in the exposure calculations for handlers. The Agency typically uses acres treated per day values that are thought to represent 8 solid hours of application work for specific types of application equipment. The Agency has used the same default values for acres treated per day for several years. These values were based on data included in PHED, consideration of agricultural engineering principles, and use and usage information. Through NAFTA (North American Free Trade Agreement) auspices, there is currently an initiative underway to harmonize the acres treated per day values used for the purposes of risk assessment. The values currently used by the Agency are similar or equivalent to those being discussed in the NAFTA working group. The actual values, specific to each scenario in the risk assessment, are presented below.

Assumptions and Factors In addition to the information presented above, the following assumptions and factors were used in order to complete this exposure assessment:

- An average occupational work day interval represents 8 hours per workday. The definition of a workday has been used by the Agency to define the number of acres that could be treated based on the application method and application site. Residential (homeowner) workday durations are defined based on how much can be treated in a single home or yard (i.e., a residential applicator workday has not been made equivalent to 8 hours of work). The values used by the Agency to represent the amount of acres that can be treated in a day (or application volumes as appropriate) for each scenario include:
  <u>For Occupational Uses In Agriculture on Terrestrial Crops/Targets (*+):</u>
  (2a) 350 acres worth of spray solution prepared when mixing/loading wettable powders for aerial and chemigation application, 350 and 800 acres are also used for aerial cotton applications;

(2b) 80 acres worth of spray solution prepared when mixing/loading wettable powders for groundboom applications;
(2c) 40 acres worth of spray solution prepared when mixing/loading wettable powders for airblast applications;
(3) 40 acres for applying sprays with an airblast sprayer;
(4) 80 acres for applying sprays with a groundboom sprayer;
(5) 350 acres for applying sprays with a fixed-wing aircraft (also accounts for helicopter applications), 350 and 800 acres are alsoused for aerial cotton applications;
(9) no data concerning applications with a power duster; and
(16) 350 acres for flagging for aerial spray applications, 350 and 800 acres are also used for aerial cotton applications.

For Occupational Direct Animal Treatments (*+):
(1a) 1000 gallons of spray solution prepared when mixing/loading liquids for high pressure handwand application;
(6) 1000 gallons of spray solution applied with a high-pressure handwand;
(10) 8 dogs per day are dusted (veterinary uses only);
(11) 8 dogs per day are dipped (veterinary uses only);
(12) 1 gallon of formulation per 50 gallons soaking solution prepared and used when mixing/loading/applying for cattle backrubbers;
(13a) 100 gallons spray solution, specified on label, prepared and applied when mixing/loading/applying liquids for backpack sprayer applications; and
(14a) 100 gallons spray solution, specified on label, prepared and applied when mixing/loading/applying liquids for low pressure handwand sprayer applications.

For Occupational Treatments on Ornamentals and Residential Use Sites (*+):
(1a) 400 gallons of spray solution prepared (40 trees & 10 gallons per tree) when mixing/loading liquids for high pressure handwand and right-of-way sprayer applications;
(1b) 50 gallons of spray solution prepared (40 trees & 1.25 gallons per tree) when mixing/loading liquids for airblast applications;
(2a) 1200 acres when mixing/loading wettable powders for aerial forestry applications;
(2b) 10 acres when mixing/loading wettable powders for groundboom applications around field perimeters and noncrop lands;
(2c) 50 gallons of spray solution prepared (40 trees & 1.25 gallons per tree) when mixing/loading wettable powders for airblast applications;
(2d) 400 gallons of spray solution prepared (40 trees & 10 gallons per tree) when mixing/loading wettable powders for high pressure handwand and right-of-way sprayer applications;
(2e) 100 gallons of dipping solution prepared when mixing/loading wettable powders for pine seedling dips;
(3) 50 gallons when applying sprays with an airblast sprayer;
(4) 10 acres when applying sprays with a groundboom sprayer;
(5) 1200 acres when applying sprays with a fixed-wing aircraft (also accounts for helicopter applications);
(6) 400 gallons when applying sprays with a high-pressure handwand;
(7) 400 gallons when applying sprays with a right-of-way sprayer;

(8) 100 gallons when dipping pine seedlings;
(13a) 40 gallons when mixing/loading/applying liquids with a backpack sprayer;
(13b) 40 gallons when mixing/loading/applying wettable powders with a backpack sprayer;
(14a) 40 gallons when mixing/loading/applying liquids with a low pressure handwand sprayer;
(14b) 40 gallons when mixing/loading/applying wettable powders with a low pressure handwand sprayer; and
(15) 48 gallons (12-2 ft^2 mounds at 4 gallons per mound) when mixing/loading/applying soluble concentrates to fire ant mounds.
[Note: Tree surgeon applications because of infestation or routine maintenance account for many of these types of applications.]

For Residential (homeowner) Direct Animal Treatments (*#):
(1) 1 dog per day is dusted; and
(2) 1 dog per day is dipped.

For Residential (homeowner) Uses on Terrestrial Crops (*#):
(3b) limited square footage (150 & 250 ft^2 for peas and potatoes, respectively) and 10 gallons (fruit trees) when mixing/loading/applying wettable powders with a backpack sprayer;
(4b) limited square footage (150 & 250 ft^2 for peas and potatoes, respectively) and 10 gallons (fruit trees) when mixing/loading/applying wettable powders with a low pressure handwand sprayer; and
(5b) limited square footage (150 & 250 ft^2 for peas and potatoes, respectively) and 10 gallons (fruit trees) when mixing/loading/applying wettable powders with a hose-end sprayer.

For Residential (homeowner) Treatments on Ornamentals (*#):
(3a) 5 gallons when mixing/loading/applying liquids with a backpack sprayer;
(3b) 5 gallons when mixing/loading/applying wettable powders with a backpack sprayer;
(4a) 5 gallons when mixing/loading/applying liquids with a low pressure handwand sprayer;
(4b) 5 gallons when mixing/loading/applying wettable powders with a low pressure handwand sprayer;
(5a) 5 gallons when mixing/loading/applying liquids with a hose-end sprayer;
(5b) 5 gallons when mixing/loading/applying wettable powders with a hose-end sprayer; and
(6) 20 gallons (5-2 ft^2 mounds at 4 gallons per mound) mixing/loading/applying soluble concentrates to fire ant mounds.

- Average body weight of an adult handler is 70 kg because the NOAELs used for the short- and intermediate-term assessments is appropriate to all adult populations based on the toxicological effect. [Note: The Agency recognizes that child applicators are a plausible subpopulation for residential scenarios and that different body weights and surface areas should be used for such calculations. A rangefinder calculation using a child body weight of 39.1 kg (excerpted from the *SOPs For Residential Exposure Assessment*) indicates that the overall risk picture does not differ significantly from the adult handler scenarios. These calculations did not account for surface area differences between adults and children.]

- As indicated above, the Agency has developed a series of unit exposures that can be used in risk assessments for different application equipment and varying levels of protection. Due to a

lack of empirical, scenario-specific data, unit exposures are sometimes calculated using generic protection factors that are intended to represent the protectiveness of various risk mitigation options (i.e., the use of PPE or Personal Protective Equipment and engineering controls). PPE protection factors include those representing layers of clothing (50%), chemical-resistant gloves (90%), and respiratory protection (80 to 90% depending upon mitigation selected). Engineering controls are generally assigned a protection factor of 98 percent. Engineering controls may include closed mixing/loading systems for liquids, closed cabs/cockpits, and closed gravity fed loading systems for granulars. Adjustments to exposure values using protection factors are made using the following equation and are completed only in lieu of scenario-specific monitoring data (PF = Protection Factor expressed as a percent reduction):

PF Adjusted Exposure = (1-(PF/100)) * (Nonadjusted Exposure Value)

Baseline occupational assessments and homeowner applicator unit exposures are typically calculated based on empirical data that is reflective of the scenario. In other words, the empirical data in PHED used to generate exposure values are generally monitoring data that were generated from individuals wearing clothing similar to the occupational baseline (long pants and long-sleeved shirt) and the homeowner applicator (short pants and short-sleeved shirts).

- Occupational label scenarios specified a “hydraulic sprayer” for use on trees. The Agency has used both high-pressure handwand data and data for right-of-way sprayers for evaluating this label requirement. This is the general approach by The Agency and has been used for several years as an approach for encoding exposure data in the Pesticide Handlers Exposure Database.

- Occupational label scenarios specified a “mistblower” for use on trees. The Agency has used data for airblast sprayers for evaluating this label requirement. This is the general approach by the Agency and has been used for several years as an approach for encoding exposure data in the Pesticide Handlers Exposure Database.

- No scenario-specific data are available to the Agency with which to assess the fire-ant mound treatments. As such, the Agency has used data for hose-end sprayers to calculate the exposures for this scenario. Hose-end sprayer data have been used to substitute routinely for sprinkler can-type applications which is also a good analogy for the fire-ant treatment that requires the dilution of phosmet in a bucket and then pouring it onto a fire-ant mound.

- No scenario-specific data are available to the Agency with which to assess the cattle backrubber treatments. As such, the Agency has used data for for the open mixing of liquids to calculate the exposures for this scenario because it appears to be the best data available with which to assess this scenario. It is likely that these data may underestimate exposures because the preparation of a cattle backrubber also involves soaking (i.e., charging) the device and placing the charged device in an animal holding area as described in the paper entitled *A Backrubber To Control Buffalo Flies* (by K.S. Waters and T.J. Reid of the Queensland Australia Department of Primary Industries) which was submitted by Schering Plough in comments on the previous phosmet RED document.

- For direct pet animal treatments, a range of dog body weights range from 5 lb (min) to 120 lb (max) were used to calculate a "to the animal" application rates (factors obtained from Professional's Choice Pet Products website at www.k9netwk.com). These values, coupled with the assumptions detailed above from the Residential SOPs, were used to calculate total human dose levels (i.e., "to the animal" application rates were used along with a percentage of the amount applied).

- No empirical data are available that would enable the Agency to quantify exposures during direct animal treatments to pets such as dogs. However, the *Standard Operating Procedures (SOPs) for Residential Exposure Assessments* include assumptions for calculating these values. The assumption excerpted from the Residential SOPs was that 10 percent of the active ingredient applied during dipping, dusting, and shampooing is used to represent total dose. These assumptions were used to estimate exposures during both occupational and homeowner applications of direct pet treatment products regardless of anticipated clothing scenarios (i.e., assumption represents both homeowner clothing and baseline occupational clothing scenarios). Further refinement of these assumptions based on clothing scenario would be inappropriate.

- Calculations are completed for a range of maximum application rates for various crop groupings in order to bracket handler risk levels associated with specific application equipment. Where available, typical application rates from the recent *Quantitative Usage Analysis* (QUA) were also used in the calculations.

- Risk mitigation options for occupational handlers are based on the Worker Protection Standard and the criteria established by the Agency in the guidance for the Pesticide Handlers Exposure Database (i.e., extra layers of clothing, chemical-resistant gloves, respirators, closed-systems, etc.). The use of PPE and engineering controls are not considered acceptable options for mitigating risks for those products sold for use by homeowners. Additionally, the clothing scenario for homeowner handlers is based on the use of short pants and short-sleeved shirts.

- Estimates of the square feet treated in homeowner gardens include 150 $feet^2$ for potatoes and 250 $feet^2$ for peas (Judkins, *et al*).

- For homeowner applications using handheld equipment such as low pressure handwands or backpack sprayers, a value of 5 gallons of spray per day is used based on the guidance provided in the *SOPs For Residential Exposure Assessment*. A similar estimate has also been used for calculating risks for hose-end sprayers. In some cases, labels indicated that up to 10 gallons per tree could be applied. These scenarios were not considered plausible by the Agency in this assessment. [Note: An appropriate label revision is required to address the requirements for these volumes. Additionally, it appears that even if a larger volume of spray solution is used, the overall risk picture would not significantly change (see Section 2c below for further details).]

- The Agency believes that intermediate-term exposures occur but that the durations of a vast majority of these exposures are less than 30 days and has completed assessments to address this exposure duration. However, for complete stewardship and for a more informed risk management decision, the Agency has also completed an intermediate-term risk assessment for exposure durations greater than 30 days even though the exposed individuals likely represent a smaller segment of the population. More refined use and usage data, that can be considered reliable for risk assessment, are required to completely eliminate this exposure duration from consideration in the risk assessment.

iv. Post-Application Exposure Scenarios

Phosmet can be used in agriculture; on ornamentals; and in the residential environment on ornamentals and companion animals (i.e., dogs). As a result, individuals can be exposed by entering previously treated areas and engaging in activities that could contribute to exposure or by contact with companion animals. [Note: Direct animal treatments in agriculture are not thought to lead to significant post-application exposures. Hence, they are not considered further in this assessment.] The Agency is concerned about exposures one could receive in the workplace or in other areas that are frequented by the general population, including residences. The purpose of this section of the document is to explain how post-application exposure scenarios were developed for each setting where phosmet can be used. Exposure scenarios can be thought of as ways of categorizing the kinds of exposures that occur related to the use of a chemical. The use of scenarios as a basis for exposure assessment is very common as described in the *U.S. EPA Guidelines For Exposure Assessment* (U.S. EPA; Federal Register Volume 57, Number 104; May 29, 1992).

Types of Exposures The Agency uses the term "post-application" to describe those

individuals who can be exposed to pesticides after entering areas previously treated with pesticides and performing certain job tasks or activities (also often referred to as reentry exposure). As with the handler risk assessment scenarios described above in Section 2.b.ii, the Agency believes that there are distinct job tasks that occur in areas previously treated with phosmet and also non-work related activities (e.g., children playing with a companion animal) that may contribute to exposure. The Agency also believes that the resulting exposures can vary depending upon the specifics of each task or activity and the levels of chemical residue available in the environment. The nature of the treated area (e.g., crop foliage level) and the duration of activity of the individual can also cause exposure levels to differ in a manner specific to each setting considered.

The agency uses a concept known as the *transfer coefficient* to numerically represent the post-application exposures one would receive (i.e., generally presented as cm^2/hour). The transfer coefficient concept has been established in the scientific literature and through various exposure monitoring guidelines published by the U.S. EPA and international organizations such as Health Canada and OECD (Organization For Economic Cooperation and Development). The establishment of transfer coefficients also forms the basis of the work of the Agricultural Reentry Task Force, of which the Gowan Chemical Company is a member. The transfer coefficient is essentially a measure of the contact with a treated surface one would have while doing a task or activity. These values are defined by calculating the ratio of an exposure for a given task or activity to the amount of pesticide on leaves (or other surfaces) that can rub off on the skin resulting in an exposure. For post-application exposures, the amounts that can rub off on the skin are measured using techniques that specifically determine the amount of residues on treated leaves or other surfaces (referred to as transferable residues) rather than the total residues contained both on the surface and absorbed into treated leaves. Transfer coefficients can be illustrated by the following example. Consider two vegetable fields where the amount of chemical on treated leaf surfaces that can rub off on the skin is the same. One field has been treated with chemical A while the other field has been treated in a similar manner with chemical B. If an individual harvests vegetables for a day in each field, the exposures the individual would receive would be similar. The transfer coefficient would also be similar for each field and chemical because the ratio of exposure to residue would be the same. If the same individual would do another activity in those fields such as scout the vegetables for pests or tie the vegetables, the exposures would be different as would the resulting transfer coefficients because the activity that resulted in the exposures is different. In this example, three distinct transfer coefficients could be determined for vegetable crops: harvesting; scouting; and tying. The Agency has developed a series of standard *transfer coefficients* that are unique for variety of job tasks or activities that are used in lieu of chemical- and scenario-specific data.

Like with the handler risk assessment process, the first step in the post-application risk assessment process is to identify the kinds of individuals that are likely to be exposed to phosmet after application. In order to do this in a consistent manner, the Agency has developed a series of general descriptions for tasks that are associated with post-application exposures. The Agency also considers whether or not individuals are exposed to pesticides as part of their employment (referred to as occupational risk assessments) or if they are individuals who are exposed to pesticide products in and around their residences or other areas frequented by the general public. Tasks associated with post-application exposures can generally be categorized using one of the following terms:

- **Post-application workers:** these individuals perform tasks as part of their employment that

cause them to enter areas previously treated with a pesticide and complete these tasks. Common examples include: agricultural harvesters, individuals involved in tree surgeon or arborist activities, and scouting activities in agriculture.

- **Residential (homeowner) Adults:** these individuals are members of the general population that are exposed to chemicals by engaging in activities at their residences and also in areas not limited to their residence (e.g., golf courses or parks) previously treated with a pesticide. These kinds of exposures are attributable to a variety of activities and usually addressed by the Agency in risk assessments by considering a representative activity that results in a conservative exposure calculation.

- **Residential Children:** children are members of the general population that are exposed to chemicals by engaging in activities in areas not limited to their residence (e.g., parks) previously treated with a pesticide. These kinds of exposures are attributable to a variety of activities such as playing outside, home gardening, or playing with a companion animal. Toddlers have been selected as a sentinel exposure population for the companion animal assessment and youth-aged children - ages 10 to 12 - are considered the sentinel population for a fruit harvesting assessment. They are usually addressed by the Agency in risk assessments by considering a representative activity that results in a conservative exposure calculation.

There are individuals who are potentially exposed to phosmet that fit into each of the categories described above. Therefore, the phosmet post-application exposure/risk assessment contains exposure scenarios in each category described above.

Use Patterns & Tasks The next step in the risk assessment process is to define how and when chemicals are applied in order to determine the level of transferable residues to which individuals could be exposed over time (i.e., to aid in the design of studies and to refine the risk assessment). Wherever available, use and usage data are used in this process to define values such as application rates and application frequency. The Agency always completes risk assessments using maximum application rates for each scenario because what is possible under the label (the legal means of controlling pesticide use) must be evaluated, for complete stewardship, in order to ensure the the Agency has no concern for the specific use. Additionally, whenever the Agency has additional information, such as minimum application rates or application frequency, it uses the information to further evaluate the overall risks associated with the use of the chemical (e.g., only a single application was considered for the phosmet post-application risk assessment). In order to define the amount of transferable residues to which individuals can be exposed, the Agency relies on chemical- and crop-specific studies as described in the Agency guidelines for exposure data collection (*Series 875, Occupational and Residential Exposure Test Guidelines: Group B - Postapplication Exposure Monitoring Test Guidelines*). The Agency has also developed a standard modeling approach that can also be used to predict transferable residues over time in lieu of chemical- and scenario-specific data (best described in the Agency's *SOPs For Residential*

Exposure Assessment). In the previous phosmet risk assessment, phosmet-specific dislodgeable foliar residue (DFR) data on citrus, pears, and grapes formed the basis for all *Restricted Entry Interval* (REI) calculations. The pear data were translated to all tree crops while the grape data were translated to all other crops.

Defining the activities that could lead to exposures related to the use of the chemical is also a critical aspect of the process. Generally, this can be a difficult aspect of the risk assessment process in that many activities are plausible and dynamics of the population of interest constantly change. As such, the Agency currently uses scenarios that represent many activities related to the populations of concern to calculate exposures. Phosmet labels allow for occupational and residential (homeowner) uses on ornamentals, in agriculture, and on companion animals. Therefore, people in their jobs can be exposed as well as both children and adults in residential settings and other areas frequented by the general public. The Agency considered both low exposure and high exposure activities for adults in an occupational setting in order to consider the range of exposures and provide for a more informed risk management decision. Risks for adults and children in the home garden setting were considered using chemical-/scenario-specific data for homegarden activities. Risks to children from treated companion animals (i.e., dogs) were considered using guidance from the Agency's *SOPs For Residential Exposure Assessment* and from Mississippi State University (for characterization purposes only).

Exposure Patterns & Toxicity Next, assessors must understand how exposures to phosmet occur (i.e., frequency and duration) and how the patterns of these occurences can alter the effects of the chemical in the population after being exposed (referred to as dose response). The Agency believes that phosmet exposures can occur over a single day or up to weeks at a time even though companion animals, many crops, and ornamentals are likely treated only a couple of times per season. This is supported by the length of time residues take to decline in the phosmet dislodgeable foliar residue studies used in the risk assessment and the fact that several areas within a work environment may be treated at different times. For example, parts of agricultural fields in a localized area might be treated over several weeks because of an infestation with a concurrent need for handlabor activities. Therefore, individuals working in those fields might be exposed from contact with treated foliage over an extended period of time that could be categorized as an intermediate-term exposure as they work on different sections of the localized field areas. The companion animal study data also support this position as transferable residues of phosmet on treated dog fur were measurable even 14 days after application (Chambers et al, 1998). Typically, the Agency conducts separate assessments for exposures that are one week or less, and also for periods greater than one week up to several months. The Agency classifies these as short-term exposures (one-week or less) and intermediate-term exposures (seven days to several months), respectively. Long-term or chronic exposures (essentially every working day over a year) can also occur for some chemicals. However, no long-term exposures are associated with the use of phosmet. These classifications are the basis for selecting toxicological endpoints for chemicals and are generally included in each risk assessment. A chemical can have different effects based on how long or how often a person is exposed. The toxicity of chemicals can also vary based on how a person is exposed. The toxicology database for phosmet indicates that the Agency needs to separately consider exposures to the skin and exposures via inhalation because the effects and the dose levels at which effects occur differ based on whether it gets on skin or it is inhaled. A 21 day dermal toxicity study (selected as a source for the dermal endpoint for phosmet) indicates that effects are similar for both the short- and intermediate-term ($\leq$30

days) periods, so dermal exposures in these categories have been considered together in this assessment. Additionally, because of hazard concerns and the consideration that a small portion of the population may be exposed over extended periods, the Agency has also completed an assessment for intermediate-term exposure durations greater than 30 days. Inhalation exposures are thought to be negligble in outdoor post-application scenarios because of the low vapor pressure and because the empirical data have also generally shown post-application inhalation exposures to be negligble. As such, inhalation exposures are not considered in this assessment. Hand-to-mouth exposures were considered in this assessment because of the pet uses and of the fact that toddlers are anticipated to routinely engage in mouthing behaviors (i.e., endpoints from aPAD and cPAD considered in assessment).

Risk Mitigation The use of personal protective equipment or other types of equipment to reduce exposures for post-application workers is not considered a viable alternative for the regulatory process except in specialized situations (e.g., a rice scout will wear rubber boots in flooded paddies). As such, an administrative approach is used by the Agency to reduce the risks and is referred to as the *Restricted Entry Interval* or REI. The REI is a measure of the time it takes for residue levels to decline to a point that entry into a previously treated area and engaging in a task or activity would not result in exposures that exceed the Agency's level of concern. REIs are generally established in the risk assessment process on a chemical-, crop-, and activity-specific basis. REIs are not considered a viable regulatory tool for reducing exposures and risks in the residential environment (i.e., for the general population). Therefore, for chemicals used in the residential environment or any other areas where the general population can be exposed, regulatory risk management currently considers the risks associated with a chemical on the day it is applied or as part of an aggregate exposure assessment should the single day risks be of no concern.

Specific Exposure Scenarios Given all of the above information, several scenarios have been developed for exposures related to phosmet use. These scenarios serve as the basis for this risk assessment. Exposure scenarios were developed for occupational uses in agricultural settings and for residential uses of phosmet. The scenarios considered in this assessment are presented below:

<u>For Occupational Uses In Agriculture and For Ornamentals (*):</u>
Based on the anticipated phosmet use patterns and current labeling, major postapplication exposure scenarios were assessed using surrogate transfer coefficients commonly used by the Agency and the chemical-specific dislodgeable foliar residue dissipation data described below. These assessments were completed based on the guidance provided in the *Draft: Series 875-Occupational and Residential Exposure Test Guidelines, Group B-Postapplication Exposure Monitoring Test Guidelines (7/24/97 Version).* The scenarios assessed include:

(1) adults harvesting tree fruit and nuts;

(2) adults harvesting and maintaining grapes;

(3) adults maintaining and harvesting field and vegetable crops such as blueberries where there is a medium potential for dermal exposure (based on the *Science Advisory Council For Exposure, Policy 003*, also addresses irrigation in grapes and scouting late season cotton);

(4) adults harvesting field and vegetable crops such as peas where there is a lower potential for dermal exposure (based on the *Science Advisory Council For Exposure, Policy 003*); and

(5) adults scouting field and vegetable crops such as peas and in some cases alfalfa where there is a lower potential for dermal exposure (based on the *Science Advisory Council For Exposure, Policy 003*, also accounts for scouting early season cotton).

* assessed to determine Restricted Entry Interval

[Note: The selection of these scenarios is in compliance with the current Agency policies for grouping postapplication exposure scenarios based on the level of exposures associated with them (i.e., a transfer coefficient can be used to represent many similar exposures). A combination of application rates, dislodgeable foliar residue data, and transfer coefficients have been used to adjust for differences between specific crops within a group (e.g., risks have been calculated separately for apples on the East and West coasts by adjusting for differences in application rates). The risks calculated for exposures in agricultural settings are thought by the Agency to represent conservative estimates of exposure and therefore, also account for exposures from other activities both in agriculture and in other uses for phosmet such as those associated with uses on ornamentals. For example, exposures resulting from activities such as tree pruning by arborists are thought to be accounted for in the assessments completed above because the exposures resulting from the non-agricultural scenarios are thought to be equal to or less than would be observed for the harvesting operations considered in the assessment (e.g., the nut and fruit tree assessment can serve as a surrogate for the arborist scenario).]

<u>For Uses In Residential Settings (#):</u>
The Agency has determined that there are likely post-application exposures because phosmet can be applied to residential areas. Based on the anticipated phosmet use patterns and current labeling, four major post-application exposure scenarios were considered in this assessment. Two of these scenarios are assessments of exposure during maintenance and harvesting of homegrown treefruit (activities on pears were monitored in the available, phosmet-specific study) for adults and youth-aged children (10 to 12 yrs) engaged in the same activity. The other two scenarios are for toddler contact with treated companion animals (dogs). One scenario assesses dose resulting from dermal contact with treated dogs while the other scenario assesses dose resulting from hand-to-mouth activity after contact with a treated dog. These assessments were based on the guidance provided in the *Draft: Series 875-Occupational and Residential Exposure Test Guidelines, Group B-Postapplication Exposure Monitoring Test Guidelines (7/24/97 Version)* and the *Draft: Standard Operating Procedures (SOPs) for Residential Exposure Assessment (12/11/97 Version)*. The four scenarios assessed include:

(1) adults harvesting and maintaining tree fruit such as pears and apples;

(2) youth-aged children (10 to 12 years old) harvesting and maintaining tree fruit such as

pears and apples;

(3) toddlers after dermal contact with treated pets (i.e., based on the draft *SOPs for Residential Exposure Assessment*); and

(4) hand to mouth dose attributable to toddler contact with treated pets (i.e., based on the draft *SOPs for Residential Exposure Assessment*).

administrative controls for risk mitigation, such as Restricted Entry Intervals, are not applicable

[Note: The dose levels calculated for adults and children are for use in the residential risk assessment and for the purposes of completing an aggregate risk assessment that also considers exposure from dietary intake of food and water. The extrapolation of exposure data used to complete the assessment for scenario 2 was based on factors for skin surface area and body weight obtained from the Agency's *SOPs For Residential Exposure Assessment*.]

v. Post-Application Exposure and Risk Assessment

As described above, the Agency considers how chemical exposures occur including how chemicals enter the body (because the toxic effects can be different) such as absorption through the skin or by being inhaled; both of these kinds of exposures are typically considered for handlers. However, in this post-application assessment, the Agency has focused on the predominant exposure pathways which are thought to be exposures to the skin (i.e., dermal) and exposures from the mouthing behaviors of children. Inhalation exposures were also considered but are thought to be negligble because of the potential for dilution and the historical data indicates these exposures are minimal.

Chemical-Specific Data The post-application risk assessment for phosmet has been developed using chemical-specific dislodgeable foliar residue data on citrus, pears, and grapes along with chemical-specific exposure data for homeowner exposures tending and harvesting treated pear trees. In the previous assessments for phosmet, these data were used to calculate Restricted Entry Intervals (REIs) for occupational exposures and to examine residential post-application exposures related to the home and garden uses of phosmet. In addition to these data, the Agency also used the preliminary data presented by Dr. Janice Chambers of Mississippi State at the 1999 Society of Toxicology meeting in New Orleans, Louisianna for risk characterization purposes related to the pet treatment analyses completed in this assessment. [Note: The Gowan Corporation has also submitted a probablistic post-application risk assessment for phosmet that has not been reviewed for the purposes of this document because the Agency is currently in the process of developing policies and guidance for reviewing these kinds of assessments.]

In order to clearly present the current post-application exposure assessment, it is necessary to present the data upon which it is based. The studies used to determine the dislodgeable foliar residue levels and human exposure levels for risk assessment purposes can be identified by the following information:

- ***Dislodgeable Residue Dissipation and Reentry Interval Calculations For Crops Treated With Products Containing Phosmet:*** Submitted by Stauffer (now Zeneca) Chemical Company; Study Completion Date: 10/22/86; Report Date: 1/16/87; Authors: Dick Knarr, Yutaka Iwata, and Kay Curry; EPA MRID 404253-01.

- ***Homeowner Exposure to Phosmet While Performing Typical Activities with Imidan Insecticide-Treated Fruit Trees:*** Submitted by Stauffer (now Zeneca) Chemical Company; Study Completion Date: 10/22/86; Report Date: 12/19/86; Authors: Dick Knarr and Yutaka Iwata; EPA MRID 401223-01.

These studies were reviewed by the Agency in 1991. The review indicated that these studies were considered acceptable to the Agency based on the review criteria appropriate for that era. The review can be identified by the following information:

- ***Review of Postapplication/Reentry Data Submitted to Support the Reregistration of Phosmet and Revision of Data Required by the 8/30/91 DCI for Phosmet (HED Project # 9-0839):*** A memo from Peg Perreault of the former Occupational and Residential Exposure Branch of HED to Lois Rossi, Special Review and Reregistration Division.

This document is a review of the data included in MRIDs 401223-01 and 404253-01. Release of this review memo from the agency to the registrants prompted two additional chemical-specific submissions including:

- ***Phosmet Dermal Passive Dosimetry Exposure Addendum to MRID 404253-01:*** Submitted by the Gowan Company, Yuma Arizona; Completion Date: 12/8/92; Author: E. Codrea; EPA MRID 425958-01 (submitted with 12/14/92 letter described below).

- ***Letter from Gowan Company, Yuma Arizona to Ms. Brigid Lowery of EPA/OPP/SRRD (Phosmet CRM) Dated December 14, 1992:*** Author: Elizabeth Codrea, Regulatory Product Manager; EPA MRID 425958-00.

Appendices C and D include tables that summarize the data, generated in these studies, used in the development of the postapplication risk assessment (MRID 404253-01). In Appendix C (the occupational aspect of the post-application risk assessment), Tables 1 through 3 present the dislodgeable foliar residue data that were generated on citrus (Table 1), pears (Table 2), and grapes (Table 3). In Appendix D, the pear DFR and accompanying exposure data are presented in Table 1 (MRID 401223-01). In order to better understand the data presented in these tables, a brief summary of the studies and accompanying correspondence is included below along with any other explanations of the data as required. [Note: The citrus data, used in the previous risk assessment, are also presented herein for informational and comparability purposes only. The Agency has been notified by the Gowan Corporation that it intends to delete the citrus use (at the high application rate of 15 lb ai/acre) from current labels. As such, no recommendations for REIs for citrus are included. This is a modification from the previous assessment in which a recommendation for a citrus REI was made by the Agency.]

MRID 404253-01: Dislodgeable foliar residue levels were quantified from three crops

(oranges, pears, and Zinfandel variety grapes) that were selected by the investigators to represent the crops for which phosmet is registered. Phosmet, formulated as Imidan 50-WP, was used to make all applications. All study sites were located in California. Oranges, selected to represent citrus crops, were treated at an application rate of 15 lb ai/acre which is the current label maximum for citrus fruits. Pears, representing the remaining tree fruits and nut crops, were treated at an application rate of 5 lb ai/acre which is the current label maximum for most other tree crops (except some nuts). Grapes, representing the remaining crops, were treated at an application rate of 1 lb ai/acre which is approximately the maximum application rate for various low row crops including grapes. The Iwata leaf punch/aqueous surfactant method was used to collect all samples. A 1 inch diameter punch was used in all cases and 48 punches were collected in each sample for a total double-sided surface area per sample of 480 cm^2. Based on sample surface area and the available recovery data (i.e., a low fortification level of 1 g/sample), the limit of quantification was defined as 0.002 g/cm^2 (i.e., this applies to both phosmet and phosmet oxon residue levels that were both screened for). All field samples collected in this study were above the limit of quantification.

Oranges: Imidan 50-WP Insecticide was applied to a commercial orange grove located outside of Visalia, in the San Joaquin Valley of California. Imidan 50-WP was applied once using an airblast sprayer at a rate of 15 lbs ai/acre. Samples were collected on days 0, 1, 3, 5, 7, 10, 14, 21, and 28 days postapplication. Weather conditions were typical, and no rainfall was reported during the study. Based on the labeling information for oranges, the high application rate is 15 lb ai/acre, the preharvest interval is 7 days, the minimum interval between applications is 30 days, and the maximum number of applications per season is 3. The dissipation data for oranges are presented in Table 1 of Appendix C. Only field recovery data were generated in this aspect of the study. Field recovery for phosmet was 84.4 percent (CV 15.6, n = 18) while field recovery for phosmet oxon was 89.6 percent (CV 15.7, n=18). The residue levels presented in Table 1 were not apparently corrected for recovery by the investigators.

Pears: Imidan 50-WP was applied to a commercial, established planting of Bartlett pears located near Walnut Grove, California. Imidan 50-WP was applied once using an airblast sprayer at a rate of 4.8 lb ai/acre. Samples were collected on days 0, 1, 2, 3, 4, 5, 7, 10, 14, 21, and 28 days postapplication Weather conditions were typical, and no rainfall was reported during the study. Based on the labeling information for pears and other tree crops (outside of citrus), the high application rate is 5.0 lb ai/acre, the preharvest interval is 7 days, and phosmet can be applied as needed. The dissipation data for pears are presented in Table 2 of Appendix C. Field and laboratory recovery data were generated in this aspect of the study. Field recovery for phosmet was 82.5 percent (CV 9.3, n = 8) while field recovery for phosmet oxon was 93.2 percent (CV 6.9, n=10). Laboratory recovery for phosmet was 89.4 percent (CV 6.7, n = 7) while laboratory recovery for phosmet oxon was 95.1 percent (CV 5.0, n=7). The residue levels presented in Table 2 were not apparently corrected for recovery by the investigators.

Grapes: Imidan 50-WP was applied to a commercial, established planting of Zinfandel grapes located near Lodi, California. Imidan 50-WP was applied by an airblast sprayer at a rate of 0.94 lbs ai/acre. One application was made. Samples were collected on days 0, 1, 3, 4, 6, 9, 13, 20, and 27 days postapplication Weather conditions were typical during the study (i.e., no unusual events). Based on the labeling information for grapes and other crops, the high application rate is 1.5 lb ai/ acre, the preharvest interval is 7 days, and phosmet can be applied as needed between egg hatch and

pupation for leaffolder, leafroller, and western grape skeletonizer. The dissipation data for grapes are presented in Table 3 of Appendix C. Field and laboratory recovery data were generated in this aspect of the study. Field recovery for phosmet was 96.9 percent (CV 6.4, n = 7) while field recovery for phosmet oxon was 98.0 percent (CV 5.2, n=9). Laboratory recovery for phosmet was 90.2 percent (CV 7.9, n = 5) while laboratory recovery for phosmet oxon was 93.8 percent (CV 10.6, n=5). The residue levels presented in Table 3 were not apparently corrected for recovery by the investigators.

MRID 401223-01: The homeowner postapplication dermal and inhalation exposure study of phosmet formulated as Imidan 50-WP was conducted in pear orchards in conjunction with the DFR study of pear dissipation included in MRID 40425301 (i.e., one application at 4.8 lbs ai/acre and no rainfall). Exposures were monitored using passive dosimetry. The Durham and Wolfe patch method was used to quantify dermal (nonhand) exposure, gloves were used to quantify hand exposures (limited ethanol handwash samples were also collected to assess relative differences between methods), and personal sampling pumps were used to quantify inhalation exposure (PVC filter and XAD resin tube). Dermal (nonhand) dosimeters (5.6 cm diameter exposed orifice) were attached to a coverall at 10 locations to measure total deposition exposure levels (i.e., "naked man") including: both shoulders, both palmar forearms three inches above the wrists, right chest just above the pocket, left back at the shoulder blade, the front of both thighs, and both shins. In addition, one dosimeter was attached to the front of a cap and two were attached to a tee shirt worn beneath a coverall.

Exposures were monitored on several days postapplication (i.e., 0, 1, 2, 3, 4, 5, 7, and 14). Two test subjects completed all replicates in this study. Four replicates were completed on each day except for Day 14 when only 2 replicates were completed for a total of 30 exposure monitoring replicates in this study. The duration of each replicate was approximately 30 minutes. The activities that were monitored in each event were intended to simulate the activities of a homeowner maintaining pear trees. In each 30 minute replicate, the test subjects picked the pears from one side of a tree and dropped them to the ground (15 minutes) and then moved from tree to tree, inspected them, and removed dead branches and leaves as a homeowner might (additional 15 minutes). Higher branches were picked from a ladder as required.

Field and laboratory recovery data were generated in this study. Average field recovery values for all matrices were greater than 80 percent and the level of precision was acceptable as coefficients of variation for all media were less than 10. Laboratory recovery results were similar indicating that little or no phosmet loss occurred during the field sampling aspect of this study. Field and laboratory recovery samples were fortified with phosmet and phosmet oxon at residue levels ranging from 1.0 g to 200.0 g per sample. The limits of detection (g/sample) reported by the investigators, for each matrix, are as follows: 5.0 - dermal patches; 5.0 - gloves; 0.5 - XAD resin tubes; 0.5 - PVC filters; and 1 - ethanol handwashes.

The results for this study, and a calculation of a chemical- and scenario-specific transfer coefficient, are summarized in Table 1 of Appendix C (22.8 mg phosmet/hour average exposure rate). The exposure data presented in Table 1 represent total deposition exposures. This particular scenario represents a plausible exposure scenario as homeowners likely would complete yard and tree maintenance wearing only shorts. Phosmet oxon was not identified in any sample. "All inhalation exposure samples had non-detectable levels of both phosmet and [phosmet] oxon. No phosmet or [phosmet] oxon was found on any of the tee shirt samples" intended to evaluate clothing penetration (i.e., a coverall which is not typically considered as an acceptable risk mitigation option for homeowner exposures).

Transfer coefficients for homeowners were calculated by HED using the human exposure and corresponding dislodgeable foliar residue data. Transfer coefficients were calculated as described in the *Calculations* chapter (Part D, Chapter 2) of the draft *Series 875-Occupational and Residential Exposure Test Guidelines, Group B-Postapplication Exposure Monitoring Test Guidelines.* The average transfer coefficient value for adults, calculated as shown in Appendix D/Table 1, over all sampling intervals was 5004 cm^2/hour (cv=16.8).

EPA Review Memo From Peg Perreault to Lois Rossi (10/18/91): This review document determined that the submissions were acceptable with two stipulations including: (1) the proposed reentry interval calculations submitted by the registrants were to be revised and (2) a postapplication air monitoring study was to be completed because of the vapor pressure of phosmet.

MRID 425958-01 (Phosmet Dermal Passive Dosimetry Exposure Addendum to MRID 404253-01): The intent of this document was to recalculate restricted entry intervals as required in the HED review of the study (10/18/91). The investigators calculated REIs using the Popendorf default transfer coefficient of 10,000 cm^2/hour and the same dissipation data that HED has used in this risk assessment. The investigators based the calculation on a rabbit 21 day dermal toxicity study (MRID 40538101) in which the NOEL was 100 mg/kg. [Note: The endpoint used by the investigators differs from those specified in the 12/19/97 HAZID document.] The investigators also used an uncertainty factor of 100 instead of the 300 used by HED. The REIs calculated by the investigators include: 66 days for oranges; 25 days for pears; and 8 days for grapes.

MRID 425958-00 (Letter from Gowan Company, Dated December 14, 1992): One of the purposes of this document was to rebut the HED requirement for a Postapplication inhalation exposure study using stationary high volume air samplers. The letter indicates "the vapor pressure originally cited in MRID 40425301 was $6x10^{-2}$ microns, not millimeters as indicated" in the 10/18/91 HED study review memo from Peg Perreault. The letter also indicates that "a more recent vapor pressure study (MRID 40344401) calculated a vapor pressure of $4.9x10^{-7}$ torr (mm Hg)." HED concurred with this rebuttal in a memo entitled *Graybeard Data Waivers and Time Extensions - April 20, 1993* (Jeff Evans, HED to Jane Mitchell, SRRD) in which the requirement for this study was dropped.

Algorithms The calculations used to estimate *Daily Dermal Dose* and *MOE*s for the post-application scenarios are similar to those described above for the handler scenarios. The only significant differences are (1) the manner in which the *Daily Dermal Dose* is calculated using a transfer coefficient, chemical-specific exposure and dislodgeable foliar residue levels, and accounting

for the dissipation of phosmet over time; (2) inhalation exposures were not calculated for the postapplication scenarios (i.e., *Total Daily Dose* in the MOE calculation only represents dose levels resulting from dermal exposures because the data do reflect inhalation exposures which have been shown, historically, to account for a negligible percentage of the overall body burden); and (3) non-dietary ingestion exposures were calculated for subpopulations where the behavior can be anticipated with relative certainty along with a calculation of associated dose from dermal exposure (i.e., mouthing behaviors of toddlers after contact with treated companion animals).

The first step in the post-application risk assessment was to complete an analysis of the available dislodgeable foliar residue (DFR) data. All residue data generated in the referenced study are presented in the Appendices C and D of this document. This database of chemical-specific dislodgeable foliar residue dissipation data was used to complete the portions of the postapplication risk assessment including for all occupational REI assessments (Occupational Scenarios 1 through 5) and in the residential scenarios for homegarden uses based on pear tending and harvesting (Residential Scenarios 1 and 2). Best fit DFR levels were calculated based on empirical data using the equation D2-16 from *Series 875-Occupational and Residential Test Guidelines: Group B-Postapplication Exposure Monitoring Test Guidelines*. The summary of the available chemical-specific DFR data, presented in the table below, were developed based on a semilog regression of empirical dissipation data for phosmet applied to two crops (pears and grapes -- orange data are also included for informational purposes only):

$$C_{envir(t)} = C_{envir(0)} e^{PAI_{(t)} * M}$$

Where:
$C_{envir(t)}$ = dislodgeable foliar residue concentration (µg/cm^2) that represents the amount of residue on the surface of a contacted leaf surface that is available for dermal exposure at time (t);
$C_{envir(o)}$ = dislodgeable foliar residue concentration (µg/cm^2) that represents the amount of residue on the surface of a contacted leaf surface that is available for dermal exposure at time (0);
e =natural logarithms base function;
PAI_t = postapplication interval or dissipation time (e.g., days after treatment or DAT); and
M = slope of line generated during linear regression of data [ln(C_{envir}) versus postapplication interval (PAI)].

The data were not corrected for recovery in any calculation by the Agency and it appears that the data also were not corrected by the investigators (i.e., overall field recoveries are around 90%). The same datapoints were used by the Agency in the development of this risk assessment as were used in various risk assessments by the Gowan Corporation. Analysis of the data can be summarized by the following:

Crop	Application Rate (lb ai/A)	Correlation Coefficient	Slope	C_0 (g/cm^2)	Half-Life (days)
Oranges	15	0.96913	-0.01710	12.00	40.5
Pears	5	0.97905	-0.06621	5.04	10.5
Grapes	1	0.94075	-0.06810	1.70	10.2

Note: This analysis is based on cumulative residues of phosmet and phosmet oxon.

In cases where no chemical-specific residue dissipation data are available, the Agency typically uses a generic dissipation model to complete risk calculations. In this case, the Agency has determined that it is more appropriate, however, to extrapolate using phosmet-specific dissipation data in the risk assessment for other currently labelled crops than it is to use the generic dissipation model. This approach is consistent with current Agency policies for generating transferable/dislodgeable residue data. The existing residue data were extrapolated to the currently labelled crops as follows:

- **Citrus Data:** These data have not been used to complete any assessment because all uses for citrus have been deleted from the label, the study was conducted at an application rate that is much higher than current labelled application rates, and the calculated half-life for this dataset is of much longer duration than noted for the pear and grape data.

- **Pear Data:** These data have been used to complete all occupational and residential assessments that were based on exposures to nuts and tree fruit (i.e., occupational postapplication scenario 1 and residential postapplication scenarios 1 and 2). This extrapolation was completed because of similarities in the application method, the crop canopy, and application rates (i.e., between the study and current labels). These data were extrapolated to various application rates including 5.95 lb ai/acre for various nut crops, 4 lb ai/acre for apples on the west coast, and 1.5 lb ai/acre for apples on the east coast. Therefore, four different calculations were completed for postapplication scenario 4 to account for differences between crops due to application rates in order to provide for a more informed risk management decision. There are other crops that can be treated such as nectarines, the maximum application rates for all crops not directly considered in the calculation need to be compared to the range of calculated risks in order to identify an appropriate risk value for determining a Restricted Entry Interval.

- **Grape Data:** These data have been used to complete all other occupational assessments (i.e., postapplication scenarios 2 through 5). This extrapolation was completed because of similarities in the application method (in some cases), the crop canopy, and application rates (i.e., between the study and current labels). No extrapolation of the data based on application rates was necessary because the study was conducted using an application rate of 1 lb ai/acre and the maximum application rates for the crops considered in exposure scenarios 2 through 5 are also 1 lb ai/acre in most cases (or very close to that rate where extrapolation would be insignificant). Therefore, different calculations were completed for postapplication scenarios 2 through 5 to account for differences between crops due to differences in the exposures/activities being considered in order to provide for a more informed risk management decision.

Residential exposures resulting from contact with treated pets were not calculated based on any of the dissipation data described above. These calculations were completed using the generic dissipation model and the preliminary data on phosmet dissipation from treated dog fur presented by Chambers et al (1998).

The next step in the risk assessment process was to calculate dermal exposure values (remembering that inhalation exposures are not assessed for these scenarios) on each post-application day after application using the following equation (see equation D2-20 from *Series 875-Occupational and Residential Test Guidelines: Group B-Postapplication Exposure Monitoring Test Guidelines* and *Residential SOP 3.2: Postapplication Dermal Potential Doses From Pesticide Residues On Gardens*):

$DE_{(t)}$ (mg/day) = ($DFR_{(t)}$ (g/cm^2) x TC (cm^2/hr) x Hr/Day)/1000 (g/mg)

Where:

DE	=	Dermal exposure at time (t) attributable for activity in a previously treated area (mg/day);
DFR	=	Dislodgeable Foliar Residue at time (t) where the longest duration (t) is dictated by the kinetics observed in the DFR studies;
TC	=	Transfer Coefficient (cm^2/hour); and
Hr	=	Exposure duration (hours).

As indicated above, the dislodgeable foliar residue represents the amount of chemical on the surfaces of treated leaves that can rub off on one's skin. The transfer coefficient is a value that represents the exposure one receives while performing a specific task or activity in an area previously treated with a pesticide. Exposure duration values represent the amount of time that individuals are expected to spend engaged in a job task or activity.

Daily dermal dose (i.e., a biologically appropriate and available dose resulting from dermal exposure) was then calculated by normalizing the daily dermal exposure value by body weight and accounting for dermal absorption as appropriate. For adult handlers using phosmet, a body weight of 70 kg was used for all exposure scenarios because the toxic effect (cholinesterase inhibition) is not sex-specific. Additionally, a dermal absorption factor of 10 percent was used for all calculations when appropriate (i.e., calculation of internal dose levels for intermediate-term exposures >30 days). Short-term and intermediate term (≤30 days) dermal risks were calculated using a 21 day dermal toxicity study. As a result, the dermal absorption factor was not applied (but was set to 100 percent as no correction to the exposure value in the calculation is appropriate). Daily dermal dose was calculated using the following formula:

$$Daily\ Dose\left(\frac{mg\ ai}{kg/day}\right) = Daily\ Exposure\left(\frac{mg\ ai}{day}\right) x \left(\frac{AbsorptionFactor(\%/100)}{Body\ Weight\ (kg)}\right)$$

Where:

Daily Dose = the amount as potential dose (for the short- and intermediate-term dermal calculations≤ 30 days) or absorbed dose (for intermediate-term dermal calculations >30 days) received from exposure to a pesticide in a given scenario (mg pesticide active ingredient/kg body weight/day);
Daily Exposure = the amount of dermal (on the skin) exposure calculated above (mg pesticide active ingredient/day);
Absorption Factor = a measure of the flux or amount of chemical that crosses a biological boundary (% of the total available); and

Body Weight = body weight determined to represent the population of interest in a risk assessment (kg).

[Note: The U.S. EPA Exposure Assessment Guidelines (EPA, 1992) define potential dose as the amount of a chemical at the absorption barrier. Additionally, absorbed dose is defined as the amount of a chemical that has been absorbed and is available for interaction with biologically significant receptors.]

Transfer Coefficients In addition to the DFR data from the study, transfer coefficients and duration of exposure are also key elements in the calculation of post-application exposures. The duration for the occupational assessments was 8 hours per day such as used by the Agency with all agricultural settings. The residential pear tree harvesting/maintenance assessment and companion animal assessment are based on 0.67 hours and 2 hours per day, respectively, as described in the Agency's *SOPs For Residential Exposure Assessment* (see discussion of exposure factors below).

The activities that were selected as the basis for the risk assessment (these have not been altered since the previous assessment) are represented by the following transfer coefficients (the corresponding exposure scenario numbers are also presented for clarity): [Note: The transfer coefficients presented below are all based on the use of a baseline clothing scenario (long pants and a long-sleeved shirt).]

- **Occupational Scenario 1: Transfer Coefficient = 10000 cm^2/hour** for adults involved in a high exposure activity such as harvesting on tree fruit and nuts such as pears (current Agency value when no chemical-/scenario-specific transfer coefficient available in accordance with the Agency's Science Advisory Council For Exposure Policy 003);

- **Occupational Scenario 2: Transfer Coefficient = 15000 cm^2/hour** for adults involved in a high exposure activity such as harvesting grapes (current Agency value when no chemical-/scenario-specific transfer coefficient available in accordance with the Agency's Science Advisory Council For Exposure Policy 003);

- **Occupational Scenario 3: Transfer Coefficient = 4000 cm^2/hour** for adults involved in a medium exposure activity such as harvesting field and vegetable crops such as blueberries or irrigating crops such as grapes (current Agency value when no chemical-/scenario-specific transfer coefficient available in accordance with the Agency's Science Advisory Council For Exposure Policy 003);

- **Occupational Scenario 4: Transfer Coefficient = 2500 cm^2/hour** for adults involved in a low exposure activity such as harvesting low row vegetable crops such as peas (current Agency value when no chemical-/scenario-specific transfer coefficient available in accordance with the Agency's Science Advisory Council For Exposure Policy 003);

- **Occupational Scenario 5: Transfer Coefficient = 1000 cm^2/hour** for adults involved in a low exposure activity such as scouting low row vegetable crops, alfalfa, and early season cotton (current Agency value when no chemical-/scenario-specific transfer coefficient available in accordance with the Agency's Science Advisory Council For Exposure Policy 003);

- **Residential Scenario 1: Transfer Coefficient = 5000 cm^2/hour** for adults involved in a high exposure activity such as tending and harvesting pears (based on chemical- and scenario-specific data submitted by the regisrant as described above - see Appendix D/Table 1 for calculation of this value);

- **Residential Scenario 2: Transfer Coefficient = 2500 cm^2/hour** for youth-aged children involved in a high exposure activity such as tending and harvesting pears (based on chemical- and scenario-specific data submitted by the regisrant as described - see Appendix D/Table 1), calculated by scaling the transfer coefficient for adults by an adjustment for child body surface area (see the Agency's *SOPs For Residential Exposure Assessment* for further information); and

- **Residential Scenario 3: Transfer Factor = 10 percent of total transferable residues** for toddlers after dermal contact with treated companion animals (see the Agency's *SOPs For Residential Exposure Assessment* for further information).

[Note: The Agency selected these transfer coefficient values to represent logical exposure values for a variety of activities associated with phosmet use. These values were selected to be protective of a range of potential post-application dermal exposures that could reasonably be expected to occur with phosmet (e.g., a transfer coefficient of 10000 cm^2/hour would also be protective of nut harvesters).]

Residential Risk Assessment The Agency has developed a document that is used by exposure assessors entitled the *SOPs For Residential Exposure Assessments* that was completed in December, 1997. This document contains guidance for considering children's exposure to treated pets. Dermal exposures from pet contact were calculated using guidance from this document including the following:

- ***Dose from dermal contact with treated pets calculated using SOP 9.2.1:*** Postapplication potential dose among toddlers from the dermal contact with a treated pet and absorption through the skin (i.e., residues that end up as body burden after deposition on and absorption through the skin).

The equation presented below illustrates how the Agency calculated dermal exposure levels used in the risk assessment for pet treatments. This equation is shown below to illustrate the differences between the pet treatment scenario and the transfer coefficient approach used for the remainder of the dermal post-application assessments.

$$DE_t = ((AR * F_{AR}) * (1-D)^t * TR_{skin})$$

where:

DE_t	=	dermal exposure at time (t) from contact with treated pet (mg/day);
AR	=	application rate or amount applied to animal in a single treatment (mg ai/animal);
F_{AR}	=	fraction of the application rate available for dermal contact as transferable residue (%/100);
t	=	time after application (days);
D	=	fraction of dissipation per day (% per day/100); and
TR_{skin}	=	fraction of the transferable residues transferred to the skin.

Risks attributable to dermal exposure were calculated in a non-probabilistic manner using the Margin of Exposure (MOE) which is a ratio of the calculated exposure to the toxic endpoint of concern. Short-term total and intermediate-term (exposure durations≤ 30 days) MOEs attributable to dermal exposure were calculated using the NOAEL from the 21 day dermal toxicity study in rats and using the NOAEL from the chronic feeding study in rats for exposures greater than 30 days, respectively. [Note: See above for details about the endpoints and body weights used as well as the adjustment for dermal absorption.] MOEs were calculated using the formula below:

$$MOE = \frac{Endpoint\left(\frac{mg}{kg/day}\right)}{Daily\ Dose\left(\frac{mg}{kg/day}\right)}$$

Where:

MOE = margin of exposure or value used by the Agency to represent risk or how close a chemical exposure is to being a concern (unitless);
Daily Dose = the amount as potential dose (for the dermal calculations ≤30 days in duration) or absorbed dose (for the dermal calculations >30 days) received from exposure to a pesticide in a given scenario (mg pesticide active ingredient/kg body weight/day); and
Endpoint = dose level in a toxicity study where no observed adverse effects occur (NOAEL) in the study (mg pesticide active ingredient/kg body weight/day).

The *Food Quality Protection Act (FQPA)* requires that the Agency aggregate (or add together) non-occupational exposures that can occur in a variety of ways to a pesticide. Exposures generally added together by the Agency are those that are thought to contribute to the overall (or aggregate) exposure of any population potentially exposed to the pesticide of concern. The assessments described above focused only on the dermal route (e.g., adults during occupational activities or those of adults and youth-aged children engaged in residential activities such as tending and harvesting pear trees). In addition, the Agency also considered exposures that may occur via the

mouthing behaviors of children after contact with treated dogs (i.e., referred to as non-dietary exposures). The Agency has developed a document that is used by exposure assessors called the *SOPs For Residential Exposure Assessments* that was completed in December, 1997. This document contains guidance for considering children's exposure to treated pets. All nondietary exposures from pet contact were calculated using guidance from this document. Specifically, the kinds of nondietary exposures that were considered in this assessment include:

- ***Dose from hand to mouth activity calculated using SOP 9.2.2:*** Postapplication potential dose among toddlers from nondietary ingestion of pesticide residues on treated pets from hand-to-mouth transfer (i.e., those residues that end up in the mouth from a child touching a pet and then putting their hands in their mouth).

The equation presented below illustrates how the Agency calculated exposure levels from hand-to-mouth activity used in the risk assessment for pet treatments.

$$NDD_t = (((AR * F_{AR}) / SA_{pet}) * (1 - D)^t * (SAL/100) * SA_{hands} * Freq * Hr)) / BW$$

where:

NDD_t	=	nondietary ingestion dose attributable to contact at time (t) with treated pets from hand-to-mouth activity (mg/kg/day);
AR	=	application rate or amount applied to animal in a single treatment (mg ai/animal);
F_{AR}	=	fraction of the application rate available for dermal contact as transferable residue (%/100);
SA_{pet}	=	surface area of a treated dog (cm^2/animal);
t	=	time after application (days);
D	=	fraction of dissipation per day (% per day/100);
SAL	=	saliva extraction factor (% extractability);
SA_{hands}	=	surface area of the hands (cm^2);
Freq	=	frequency of hand-to-mouth events (events/hour);
Hr	=	exposure duration (hours); and
BW	=	body weight (kg).

After the nondietary dose levels were calculated with this equation, MOEs were calculated using the same equation described above except that the endpoint selected as the basis for the aPAD (acute population adjusted dose) was selected (i.e., NOAEL for the rat acute neurotoxicity study of 4.5 mg/kg/day). Nondietary ingestion risks were also characterized by consideration of the endpoint used for the development of the cPAD (chronic population adjusted dose) which is based on the chronic feeding study in rats (i.e., NOAEL of 1.1 mg/kg/day). Calculation of MOEs using the aPAD endpoint is based on these kinds of exposures being sporadic (e.g., a child has incidental contact with a treated dog) while calculation of MOEs using the cPAD endpoint is based on exposures being more consistent or repetitive in nature (e.g., a child has routine contact with a treated dog such as a family pet).

In the assessment for toddler postapplication exposure, MOEs were added together in order to consider total risks given that the toxic effect (cholinesterase inhibition) for each route of exposure is the same. Post-application nondietary exposures were added to the corresponding dermal exposures during the aggregate calculation for the toddlers. The equation the Agency used to add MOEs together is presented below:

$$MOE_{total} = 1/((1/MOE_{dermal}) + (1/MOE_{nondietary\ ingestion}))$$

Where:

MOE_{dermal} and $MOE_{nondietary\ ingestion}$ represent MOEs for each exposure route of concern

A margin of exposure (MOE) uncertainty factor of 100 is considered an appropriate risk level for for all assessments completed regardless of whether the exposure is occupational or residential in nature.

Calculations & Results The results of the dermal exposure/risk calculations are presented in Appendices C and D. Appendix C contains the results of the occupational aspects of the post-application risk assessment. The DFR data from citrus (presented for informational purposes only); pears; and grapes are presented in Appendix C/Tables 1 through 3, respectively. A summary of the DFR data adjusted for each scenario are presented in Table 4. Table 5 contains the dose values calculated from these DFR values. The MOEs used for determinations of an REI are presented in Table 6. This table contains the results for each of the five occupational scenarios for each crop/application rate combination considered. This table has calculations based both on daily exposures using the 21 day dermal toxicity endpoint (for durations $\leq$30 days) and a monthly average exposure calculated for comparison with the intermediate-term endpoint from the chronic feeding study in rats (for durations > 30 days).

Appendix D contains the results of the residential aspects of the post-application risk assessment. The pear DFR dissipation data are presented in Table 1 (i.e., this is the same table as in Appendix C/Table 2). The pear DFR, concurrent exposure data, and calculated transfer coefficients used in the risk assessment for homeowner exposures are presented in Appendix D/Table 2. Tables 3 and 4 contain the MOEs for various days after application for adults and youth-aged children involved in the tending and harvesting of pears. Each of these tables has a calculation based on daily exposures using the 21 day dermal toxicity endpoint and a monthly average exposure calculated for comparison with the intermediate-term endpoint from the chronic feeding study. Tables 5, 6, and 7 contain the MOEs for various days after application for toddlers after contact with treated companion animals (i.e., dogs). Table 5 contains the assessment for dermal contact with treated dogs while Table 6 contains the assessment for hand-to-mouth activity. Table 5 has a calculation based on daily exposures using the 21 day dermal toxicity endpoint and a monthly average exposure calculated for comparison with the intermediate-term endpoint from the chronic feeding study. Table 6 calculations are similar based on the appropriate endpoints for dietary exposures (i.e., risks from daily exposures were calculated using the aPAD endpoint while risks from monthly exposures were calculated using the cPAD endpoint). Table 7 presents the MOEs that represent total exposure values for children's contact with treated dogs.

Assumptions and Factors The following specific assumptions and factors were used in order

to complete this exposure assessment:

- These assessments were based on the guidance provided, as appropriate, in the *Draft: Series 875-Occupational and Residential Exposure Test Guidelines, Group B-Postapplication Exposure Monitoring Test Guidelines (7/24/97 Version)* and the *Draft: Standard Operating Procedures (SOPs) for Residential Exposure Assessment (12/11/97 Version)*. Several of the assumptions and factors used in the exposure assessment are described in that document (e.g., 20% transferability from treated dog fur). The Agency brought modifications to the *SOPs For Residential Exposure Assessment* before the FIFRA SAP in September, 1999. As a result of that meeting, the Agency has modified some of the inputs used for the calculations completed in this assessment. The modifications included altering the surface area and frequency inputs for the toddler nondietary ingestion calculations, respectively, from 350 cm^2 to 40 cm^2 (representing the palmar aspects of the fingers) per event and from 1.56 events/hour to 20 events/hour. A saliva extraction factor of 50 percent was also added to the nondietary ingestion exposure calculation in order to more realistically model the transfer processes from a contaminated hand in the mouth (i.e., prior, quantitative transfer was the basis for this calculation which appears overly conservative based on available data). The Agency also presented information on potential new approaches for calculating dermal exposures from treated pets at that meeting of the SAP. The results were inconclusive with regard to this issue so the dermal exposures from treated pets were calculated based on the guidance presented in the *SOPs For Residential Exposure Assessment* without modification.

- The average body weight of an adult used in all assessments is 70 kg because the NOAELs used for the short- and intermediate-term assessments are based on a endpoint appropriate to both male and female populations. The average body weight for toddlers used in all assessments is 15 kg based on the *SOPs For Residential Exposure Assessment*.

- For direct pet animal treatments, a range of dog body weights range from 5 lb (min) to 120 lb (max) were used to calculate a "to the animal" application rates which, coupled with the assumptions detailed above from the *SOPs For Residential Exposure Assessment*, were used to calculate total human dose levels (i.e., "to the animal" application rates were used along with a percentage of the amount applied).

- The use of administrative controls (i.e., establishing an REI) are not considered acceptable options for products sold for use by homeowners.

- For the occupational risk assessment, single day exposures were calculated to reflect chemical-specific residue dissipation rates over time coupled with surrogate transfer coefficients ranging from 1,000 to 15,000 cm^2/hour. The chemical-specific dissipation data used in this assessment were generated on pears and grapes (orange data were also available and used solely for characterization purposes). The pear and grape data were bridged to other crops as described above (i.e., pear data for all tree crops and grape data for all other crops). Likewise, the transfer coefficients selected are intended to represent the range of activities associated with the cultivation of each crop considered in the risk assessment. They are also intended to bracket the risks associated with other crops where phosmet can be used but not selected as a basis for the analysis. All occupational postapplication risk assessments

were completed by calculating MOEs using the 21 day dermal toxicity study endpoint and the daily exposures. Daily exposures were also amortized over a monthly interval and compared with the chronic rat endpoint to address exposures that exceed 30 days. It is likely that an occupationally exposed population could be subjected to areas where repetitive applications have occurred thus requiring HED to assess each scenario using daily exposure levels for durations up to 30 days. It is also not as likely, yet still probable, that there might be a small segment of the exposed populations for which the exposure duration exceeds 30 days. In these cases, risks have been calculated also using an amortized monthly dose.

- In the short-term residential risk assessment for home and garden uses (e.g., pears), the Agency has calculated single day exposures to reflect chemical-specific residue dissipation rates over time coupled with scenario-/chemical-specific transfer coefficients of 5,000 cm^2/hour (2,500 cm^2/hour for children -- calculated by halving the adult transfer coefficient value as was done in the *SOPs For Residential Exposure Assessment* to account for body weight and skin surface area differences). The Agency believes that repetitive applications or actvities generally will not occur on subsequent days for the extended period in order to trigger an intermediate-term MOE calculated using the peak dose level (i.e., similar approach to short-term assessment). By definition, intermediate-term biological effects are not triggered until sustained exposure at the endpoint dose levels occur. Based on this premise and to account for any segment of the population that is exposed over an extended period, MOEs for the intermediate-term assessment were calculated using a dose level that was derived by taking the average of the dose levels from applications occurring on a monthly basis (i.e., a 30 day average was used for the intermediate-term assessment when considering exposures > 30 days). This approach was also used for the residential pet use exposure scenarios.

- The exposure duration for occupationally exposed populations is 8 hours. However, for residential postapplication scenarios, several exposure durations were considered in the development of this risk assessment including 0.67 hours per day engaged in homegardening activities and 2 hours per day for children engaged in hand-to-mouth activity. These values are excerpted from the *SOPs For Residential Exposure Assessment.* In other cases an exposure duration value was not required as the assessment is based on using a simple percentage of the available residues as the exposure value.

- The application rate to dogs is based on a relationship between skin surface area and weight as discussed in the *SOPs For Residential Exposure Assessment.*

- Due to a lack of scenario-specific exposure data, HED has calculated unit exposure values for adults using surrogate dermal transfer coefficients that represent reasonable exposures for occupationally exposed populations (i.e., low exposure potential for row crops of 1,000 cm^2/hour ranging up to high exposure activities of 15,000 cm^2/hour). Residential exposures associated with the home garden uses of phosmet were assessed using a chemical-specific transfer coefficient of 5,000 cm^2/hour (½ that for children). Residential pet concerns were assessed based on guidance provided in the *SOPs For Residential Exposure Assessment* (i.e., a percentage of the application rate is available for exposure).

- The available dislodgeable foliar residue data for pears, citrus, and grapes were used to complete all occupational risk assessments and the residential home garden assessment. The grape DFR data were used to evaluate grapes and other low row crops (i.e., different dermal transfer coefficients were used). The pear DFR data were used to assess both occupational pear harvesters and pear maintenance in a residential setting. A dissipation rate of 5 percent per day was assumed for residential pet exposure scenarios. [Note: This is a departure from the *SOPs For Residential Exposure Assessment* that indicate that no dissipation would occur as the objective is to maintain a consistent level to achieve an efficacious dose. This dissipation value is based on preliminary J. Chambers data presented at Society of Toxicology 1999 meeting.]

c. Occupational and Residential Risk Assessment Summary and Characterization

The risk assessment completed in Section 2.b is summarized herein. Please refer to the tables presented in Appendices A through D if required as they are the basis for this risk assessment. This section of the document presents the results of the risk assessment and the factors that should be considered when interpreting the results.

i. General Risk Characterization Considerations

Several issues must be considered that pertain to the quality of the assessment and when interpreting the results of the occupational handler and residential postapplication risk assessment. These include:

- No chemical-specific handler exposure data were submitted. As a result, all analyses were completed using surrogate exposure data from sources such as PHED or the *SOPs For Residential Exposure Assessment*. Several handler assessments were completed using "low quality" PHED data due to the lack of a more acceptable dataset (see Exposure Scenarios in Section 2b and Table 1 in Appendices A and B for further details). Additionally, in some cases, no empirical data were available for the scenario but an exposure assessment approach was developed based on an approach outlined in the *SOPs For Residential Exposure Assessment*. In these cases, the assumptions and approaches included in the SOPs served as the basis for the assessment (e.g., pet dipping or dog collar application). The PHED unit exposure values range between the geometric mean and the median of the available exposure data. Factors derived from the *SOPs For Residential Exposure Assessment* are generally considered to be conservative.

- Surrogate dermal transfer coefficients were used to assess occupational postapplication exposures (e.g., grape or citrus harvesting) and to develop residential postapplication exposure estimates for pet use scenarios (i.e., based on the *SOPs For Residential Exposure Assessment*). Chemical-specific postapplication exposure and concurrent dislodgeable foliar residue data were generated for residential home garden scenarios. The activities simulated in this study included pear harvest and tree maintenance. These data were used to develop dermal transfer coefficients for adults and children engaged in fruit tree maintenance activities. The pear exposure study was conducted in a manner that represents a person wearing no clothing (i.e., dosimeters were worn on the exterior of clothing). Therefore, it is

logical to conclude that the post-application exposures calculated using these transfer coefficients probably represent higher levels of exposure because normal attire anticipated by the Agency would offer a level of protection and reduce exposures. Adult test subjects were utilized in this study and the resulting adult transfer coefficients were scaled down using a surface area and weight relationship to obtain transfer coefficients for children (i.e., the scale down process was also used in the Agency's *SOPs For Residential Exposure Assessment*). The chemical-specific exposure and dislodgeable foliar residue studies submitted by the registrant were reviewed by the Agency and determined to be acceptable for risk assessment purposes. The surrogate transfer coefficients used to calculate occupational postapplication exposures are based on published empirical data and are generally considered to represent reasonable estimates of dermal exposure. These transfer coefficient values are based on the use of normal work clothing. Factors derived from the *SOPs For Residential Exposure Assessment* are generally considered to be conservative. The chemical-specific transfer coefficient was based on calculating the mean of the transfer coefficients for several days of monitoring in the study (i.e., the value is not a conservative representation of the available data).

- Several generic protection factors were used to calculate handler exposures. The protection factors used for clothing layers and gloves have not been completely evaluated by the Agency. There is an ongoing project through NAFTA to address the issue of protection factors (a draft document not yet available for public review assessing protection factors using PHED has been completed). The key element being evaluated by the Agency are the factors for clothing and gloves. The value used for respiratory protection is based on the *NIOSH Respirator Decision Logic.* It should also be noted that the value used for gloves is in the range that OSHA and NIOSH often use.

- Exposure factors used to calculate daily exposures to handlers are based on applicable data if available. Otherwise, values are based on the best professional judgement of Agency assessors due to a lack of pertinent data and assumptions such as the number of animals treated per day or the number of gallons spray solution prepared and applied for handheld equipment types. The recent draft NAFTA exposure factor summary (e.g., acres/day/equipment type) was also consulted. These factors are believed to represent reasonable to conservative estimates for calculating exposures.

- The Agency has completed a risk assessment for endpoints for an exposure duration of greater than 30 days (i.e., intermediate-term exposures >30 days). It should be noted that even though the Agency has completed this assessment, it is unlikely that many individuals will be exposed in this manner given the way that phosmet is likely used and based on the recent use and usage data provided that indicate (in agriculture) that phosmet is generally used up to about a maximum of 5 times per year. This issue has been identified for consideration in the risk mitigation process for phosmet. There is insufficient use and usage data to negate this duration of exposure.

- For lack of appropriate PHED data, only mixer/loader data are used to assess the cattle backrubber and the pine seedling dip scenario. This likely underestimates exposure, since no applicator exposure is represented even given the information in the document A *Backrubber*

to Control Buffalo Flies.

- Job functions are not combined for some scenarios where field logistics might dictate that a single person would complete all aspects of the application process (e.g., mixer/loaders and groundboom or airblast applications). In these cases, the Agency has calculated values for each aspect of the job (e.g., separately for wettable powder mixer/loaders and for groundboom applicators even though an individual may complete all job tasks).

- For lack of appropriate PHED data, mixer/loader/applicator data for hose-end sprayers were used to assess fire ant control applications. The nature of these application methods are believed to be similar enough to bridge the data.

- Both phosmet and phosmet oxon were monitored in the available dislodgeable foliar residue data. For the purposes of the calculations included in this chapter, both were added together to obtain a total residue value that was used in all aspects of the risk assessment process. The total residues were considered to be phosmet equivalents in the process (i.e., no toxicity endpoints were used that considered the oxon alone).

- The Agency considered groups of crops/use sites, application rates, and activities in this assessment (e.g., a transfer coefficient for harvesting was used for all risks associated with post-application occupational exposures. With the development of more refined data, the Agency will complete risk assessments for more activities. In analogous fashion every potential exposure pattern (i.e., by rate and crop) were not considered because of a lack of data to support the inputs and because of the complexity that would be added to the risk assessment.

- The Agency always considers the maximum application rates allowed by labels in its risk assessments in order to be able to consider what is legally possible based on the label in order to ensure proper stewardship. If more information is available concerning the use patterns of the chemical, the Agency tries to incorporate it into the risk assessment process. Average application rates, used to represent typical application rates for the purposes of this analysis, were available. The results of this analysis indicate that in most cases, average application rates differ from maximum application rates on average by a factor of two to four. The Agency used these rates in the assessment. However, the impact on the calculated risks is small because there is little difference between the average and maximum application rates.

- The preliminary data generated by Dr. Janice Chambers at Mississippi State University support the pet fur dissipation assumptions used by the Agency. The data indicate that measurable residues were found on pet fur at 14 days after application. The levels quantified at this time interval, it should be noted, were also well above the limit of quantification in the study at this interval.

- The post-application risk assessments are based on chemical-specific DFR data in three different crops and the homeowner risks for pear harvesting and maintenance are based on chemical- and scenario-specific exposure data. The DFR dissipation data for pears and grapes were used to bridge to other crops as no additional data were available. Pear data

were used to assess post-application risks for tree crops (an adjustment for application rate was also required for some crops) and grape data were used to assess risks for vegetable and other low row crops.

- The calculations used to complete the dermal aspects of the postapplication risk assessment for toddlers are under review by the Agency and the approach might be revised to represent a "dermal hug" of a treated animal as discussed at the September 1999 FIFRA SAP meeting. The dermal calculations were completed using the guidance provided in the current version of the SOPs For Residential Exposure Assessment. Given the results, it is believed that even if another calculation method is used, the results would still represent a level of concern for the Agency (i.e., the calculated exposure values would not differ enough to alter the results of the risk assessment).

- This assessment reflects the Agency's current approaches for completing residential exposure assessments based on the guidance provided in the *Draft: Series 875-Occupational and Residential Exposure Test Guidelines, Group B-Postapplication Exposure Monitoring Test Guidelines (7/24/97 Version)*, the *Draft: Standard Operating Procedures (SOPs) for Residential Exposure Assessment (12/11/97 Version)*, and the *Overview of Issues Related to the Standard Operating Procedures for Residential ExposureAssessment* presented at the September 1999 meeting of the FIFRA Scientific Advisory Panel (SAP). The Agency is, however, currently in the process of revising its guidance for completing these types of assessments. Modifications to this assessment shall be incorporated as updated guidance becomes available and it is feasible from a regulatory perspective. This will include expanding the scope of the residential exposure assessments by developing guidance for characterizing exposures from other sources already not included such as from spray drift; residential residue track-in; exposures to farmworker children; and exposures to children in schools.

Refinement of the ORE exposure and risk assessment calculations presented in this chapter is possible if the issues presented above are addressed by the registrant or if more refined approaches and data become available to HED (e.g., research related to toddler hand-to-mouth activity or publication of J. Chambers data).

ii. Occupational Handler Risk Summary

In this current assessment, which is based on a different approach from the previous assessments completed for phosmet, risks for handlers were assessed using separate toxicological endpoints for both dermal and inhalation exposures. The resulting risks (MOE values) were then added in order to obtain an overall risk for each applicator that accounted for both dermal and inhalation exposures for each exposure duration considered. Dermal and inhalation risks are mitigated using different types of protective equipment such that it may be acceptable to add a pair of gloves and not a respirator, and vice versa.

Calculations & Results Presentation All of the risk calculations for occupational handlers completed in this assessment are included in Appendix A. The specifics of each of table included in Appendix A are described below as well as a summary of the risks for each exposure scenario.

- **Table 1: Sources of Exposure Data Used in the Occupational Phosmet Handler Exposure and Risk Calculations** Describes the sources of the exposure data used in all of the occupational handler calculations.

- **Table 2: Input Parameters For Phosmet Occupational Handler Exposure and Risk Calculations** Presents the exposure values and other exposure factors used in the occupational handler risk assessments.

- **Table 3: Phosmet Occupational Handler Exposure and Risk Calculations At The Baseline Protection Level** Represents typical work clothing or a long-sleeved shirt and long pants with no respiratory protection. No chemical-resistant gloves are included in this scenario. Therefore, some scenarios have no baseline dermal exposure assessments (see notes on Table 2). [Note: The calculations from this table have been used to develop the summary in Tables 7, 8, and 9.]

- **Table 4: Phosmet Occupational Handler Exposure and Risk Calculations At The Minimum PPE Protection Levels** Represents the baseline scenario with the use of chemical-resistant gloves and PF 5 respirators. [Note: The calculations from this table have been used to develop the summary in Tables 7, 8, and 9.]

- **Table 5: Phosmet Occupational Handler Exposure and Risk Calculations At The Maximum PPE Protection Levels** Represents the baseline scenario with the use of an additional layer of clothing (e.g., a pair of coveralls), chemical-resistant gloves, and, in some cases, a PF 10 respirator. [Note: The calculations from this table have been used to develop the summary in Tables 7, 8, and 9.]

- **Table 6: Phosmet Occupational Handler Exposure and Risk Calculations At The Engineering Control Protection Levels** Represents the use of an appropriate engineering control such as a closed tractor cab or closed loading system for granulars or liquids. Engineering controls are not applicable to handheld application methods there are no known devices that can be used to routinely lower the exposures for these methods. [Note: The calculations from this table have been used to develop the summary in Tables 7, 8, and 9.]

- **Table 7: Phosmet MOEs Attributable to Occupational Dermal Exposure** Summarizes all MOEs calculated for dermal exposures at each level of personal protection (i.e., baseline through engineering controls). [Note: See tables 3 through 6 for calculations of specific MOE values.]

- **Table 8: Phosmet MOEs Attributable to Occupational Inhalation Exposure** Summarizes all MOEs calculated for inhalation exposures at each level of personal protection (i.e., baseline through engineering controls). [Note: See tables 3 through 6 for calculations of specific MOE values.]

- **Table 9: Phosmet MOEs Attributable to Combined Short-Term Dermal and Inhalation Exposures (≤7 Days Duration)** Presents combined dermal and inhalation MOEs with each possible combination of dermal and respiratory protection considered in this assessment. Only exposure durations≤ 7 days are included in this table. [Note: See tables 3 through 6 for calculations of specific MOE values.]

- **Table 10: Phosmet MOEs Attributable to Combined Intermediate-Term Dermal and Inhalation Exposures (>7 & ≤30 Days Duration)** Presents combined dermal and inhalation MOEs with each possible combination of dermal and respiratory protection considered in this assessment. Only exposure durations of >7 and ≤30 days are included in this table. [Note: See tables 3 through 6 for calculations of specific MOE values.]

- **Table 11: Phosmet MOEs Attributable to Combined Intermediate-Term Dermal and Inhalation Exposures (>30 Days Duration)** Presents combined dermal and inhalation MOEs with each possible combination of dermal and respiratory protection considered in this assessment. Only exposure durations of >30 days are included in this table. [Note: See tables 3 through 6 for calculations of specific MOE values.]

Tables 1 through 6 of Appendix A illustrate how the calculations were performed to define the risks (i.e., MOEs) for phosmet handlers. The exposure data and exposure factors represent the best sources of data currently available to the Agency for completing these kinds of assessments. For example, maximum application rates were derived directly from phosmet labels. The recent use and usage report was also used to define average application rates as well as the annual frequency of application rates per crop. Exposure factors (e.g., body weight, amount treated per day, protection factors, etc.) are all standard values that have been used by the Agency over several years and are derived from peer reviewed sources whenever possible (e.g., Exposure Factors Handbook) and the PHED unit exposure values are the best available estimates of exposure. Some PHED unit exposure values are high quality while others represent low quality, but the best available, data. Tables 7 and 8 provide summaries of the MOE values calculated for each route of exposure, dermal and inhalation, respectively, in the risk assessment. Tables 9 through 11 provide the information that are the key to interpreting the overall results of the risk assessment because they contain the overall risks calculated using several combinations of personal protection for each exposure duration considered (e.g., short-term MOEs are presented in Table 9).

When protective measures are used to reduce risks it is appropriate to consider how each method will reduce the associated risks (e.g., gloves will reduce risks from dermal exposures by 90 percent based on the Agency protection factor for gloves). This is particularly important when route-specific (how the chemical enters the body) toxicity data are available, as is now the case for phosmet, because this information allows for more flexibility in the risk management process (information presented in Appendix C/Tables 7 & 8). In addition, it is necessary to consider the combined risks for each scenario so that the risk management decision can be protective in an overall manner and also be based on the minimum level of personal protection from dermal and inhalation exposures. This is the key element in the risk assessment. The combined risks calculated for phosmet handlers are summarized below (Appendix A/Tables 9 through 11).

The risks are summarized based on the specific markets for phosmet use and the lowest level of personal protection where the Agency has no concern. The level of concern for all assessments is established by an uncertainty factor of 100. [Note: Each analysis below is based on the minimum level of personal protection required to exceed the Agency's level of concern.]

Risks For Occupational Uses In Agriculture on Terrestrial Crops/Targets

- **(2a) mixing/loading wettable powders for aerial and chemigation application:**

  On Tree Fruit and Nut Crops The maximum application rate is 1.5 to 5.95 lb ai per acre depending upon the crop (i.e., fruit trees such as pears are at a maximum rate of 5 lb ai/acre while various nut trees are at 5.95 lb ai/acre). Typical application rates range from 1.0 lb ai/acre for kiwi fruit to 3.1 lb ai/acre for walnuts. Tree fruit and nut crops also included in this range of application rates are apples, apricots, cherries, nectarines, peaches, pears, plums/prunes, almonds, and pecans. When short-term dermal and inhalation exposures ($\leq$7 days) were combined, MOEs>100 (MOE range <1 to 92) could not be achieved for all application rates except at 1 lb ai/acre with the use of engineering controls (MOE = 138). When intermediate-term (>7 & $\leq$30 days) dermal and inhalation exposures were combined, MOEs>100 (MOE range <1 to 86) could not be achieved for all application rates except at 1 lb ai/acre with the use of engineering controls (MOE = 128). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 could not be achieved for all application rates considered (MOE range of <1 to 94 -- 94 only at 1 lb ai/acre with engineering controls, all others <63).

  On grapes The maximum application rate is 1.5 lb ai per acre and the typical application rate is 1 lb ai/acre. When short-term dermal and inhalation exposures ($\leq$7 days) were combined, MOEs>100 (MOE range <1 to 92) could not be achieved for either application rate except at 1 lb ai/acre with the use of engineering controls (MOE = 138). When intermediate-term (>7 & $\leq$30 days) dermal and inhalation exposures were combined, MOEs>100 (MOE range <1 to 85) could not be achieved for all application rates except at 1 lb ai/acre with the use of engineering controls (MOE = 128). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 could not be achieved for all application rates considered (MOE range of <1 to 94 -- 94 only at 1 lb ai/acre with engineering controls, all others <63).

On field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels) The maximum application rates range from 0.7 to 1 lb ai per acre depending on crop and formulation. Typical application rates range from 0.4 lb ai per acre for cotton and 0.5 lb ai per acre for green peas up to the maximum allowable application rates for various crops (e.g., 0.7 lb ai per acre for alfalfa and 1 lb ai per acre for blueberries). When short-term dermal and inhalation exposures (≤7 days) were combined using the 1 lb ai/acre rate, MOEs>100 (MOE range 2 to 23) could not be achieved except for the use of engineering controls (MOE = 138 on all crops except cotton, cotton MOE = 151). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 (MOE range <1 to 19) also could not be achieved except for the use of engineering controls (MOE = 128 on all crops except cotton, cotton MOE = 140). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 could not be achieved (MOE range of <1 to 94 -- 94 only at 1 lb ai/acre with engineering controls, all others <63) except for cotton with the use of engineering controls at an application rate of 0.4 lb ai/acre (MOE = 103).

- **(2b) mixing/loading wettable powders for groundboom application:**

On grapes The maximum application rate is 1.5 lb ai per acre and the typical application rate is 1 lb ai/acre. When short-term dermal and inhalation exposures (≤7 days) were combined, MOEs>100 (MOE range 2 to 91) could not be achieved except for the use of engineering controls (MOE = 401 to 602 based on maximum and typical rates). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 (MOE range 2 to 76) could not be achieved except for the use of engineering controls (MOE = 374 to 561 based on maximum and typical rates). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 could not be achieved (MOE range 2 to 56) except for with the use of engineering controls (MOE = 274 to 411 based on maximum and typical rates).

On field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels) The maximum application rates ranges from 0.7 to 1 lb ai per acre depending on crop and formulation. Typical application rates range from 0.4 lb ai per acre for cotton and 0.5 lb ai per acre for green peas up to the maximum allowable application rates for various crops (e.g., 0.7 lb ai per acre for alfalfa and 1 lb ai per acre for blueberries). When short-term dermal and inhalation exposures were combined for all crops except cotton using the 1 lb ai/acre rate as an example, MOEs>100 (MOE range 3 to 91) could not be achieved except for the use of engineering controls (MOE = 602 on all crops except cotton). An adequate level of protection at the typical cotton application rate requires the use of chemical-resistant gloves and single layer clothing (cotton MOE = 105). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined for all crops except cotton using the 1 lb ai/acre rate as an example, MOEs>100 (MOE range 3 to 76) could not be achieved except for the use of engineering controls (MOE = 561 on all crops except cotton). An adequate level of protection at the typical cotton application rate requires the use of chemical-resistant gloves, a PF 5 respirator, and single layer clothing (cotton MOE = 128). When intermediate-term (>30 days) dermal and inhalation exposures were combined using the 1 lb ai/acre rate as an example, MOEs>100

(MOE range 2 to 56) could not be achieved except for the use of engineering controls (MOE = 411). An adequate level of protection at the typical cotton application rate requires the use of chemical-resistant gloves, a PF 10 respirator, and single layer clothing (cotton MOE = 128).

- **(2c) mixing/loading wettable powders for airblast applications:**

  On Tree Fruit and Nut Crops The maximum application rate is 1.5 to 5.95 lb ai per acre depending upon the crop (i.e., fruit trees such as pears are at a maximum rate of 5 lb ai/acre while various nut trees are at 5.95 lb ai/acre). Typical application rates range from 1.0 lb ai/acre for kiwi fruit to 3.1 lb ai/acre for walnuts. Tree fruit and nut crops also included in this range of application rates are apples, apricots, cherries, nectarines, peaches, pears, plums/prunes, almonds, and pecans. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved for application rates 3 lb ai/acre only with the use of engineering controls (MOEs using engineering controls range from 202 to 401, all others were < 61). The 1.0 lb ai/acre rate required the use of single layer clothing, gloves and a PF 5 respirator while the 1.5 lb ai/acre rate required the use of double layer clothing, gloves and a PF 5 respirator. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved for application rates 3 lb ai/acre only with the use of engineering controls (MOEs using engineering controls range from 189 to 374, all others were < 51). The other rates of 1.5 lb ai/acre required the use of double layer clothing, gloves, and a PF 10 respirator while the 1.0 lb ai/acre rate required the use of single layer clothing, gloves, and a PF 5 respirator. When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved only for application rates 1.5 lb ai/acre with engineering controls (MOEs using engineering controls range from 138 to 548, all others were < 74). At an application rate of 1.0 lb ai/acre, MOEs >100 (MOE = 111) with the use of double layer clothing, gloves, and a PF 10 respirator.

  On grapes The maximum application rate is 1.5 lb ai per acre and the typical application rate is 1 lb ai/acre. When short-term dermal and inhalation exposures were combined, MOEs>100 (MOE range 5 to 96) could not be achieved except for the use of maximum personal protective equipment (PF 5 or PF 10 respirators) or engineering controls (MOE 110 to 1204). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 could not be achieved except for the use of maximum personal protective equipment (PF 5 respirator at typical rate or PF 10 respirator at maximum rate) or engineering controls (MOE 101 to 1122). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 at all application rates could not be achieved except for the use of engineering controls (MOE 548 to 823) or with maximum levels of personal protection (double layer clothing, gloves, and PF 10 respirator) at the typical application rate (MOE = 111).

On field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels) The maximum application rates ranges from 0.7 to 1 lb ai per acre depending on crop and formulation (i.e., the 1 lb ai per acre for blueberries is the key concern for this scenario). When short-term dermal and inhalation exposures were combined, MOEs>100 could be achieved with the use of single layer clothing, gloves, and a PF 5 respirator or greater levels of personal protection (MOE 132 to 1204). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 could be achieved with the use of single layer clothing, gloves, and a PF 5 respirator or greater levels of personal protection (MOE 103 to 1122). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 could not be achieved except for the use of maximum levels of personal protection (double layer clothing, gloves, PF 10 respirator) or engineering controls (MOE 111 to 823, all others < 89).

- **(3) applying sprays with an airblast sprayer;**

On Tree Fruit and Nut Crops The maximum application rate is 1.5 to 5.95 lb ai per acre depending upon the crop (i.e., fruit trees such as pears are at a maximum rate of 5 lb ai/acre while various nut trees are at 5.95 lb ai/acre). Typical application rates range from 1.0 lb ai/acre for kiwi fruit to 3.1 lb ai/acre for walnuts. Tree fruit and nut crops also included in this range of application rates are apples, apricots, cherries, nectarines, peaches, pears, plums/prunes, almonds, and pecans. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved for application rates 1.5 lb ai/acre only with the use of engineering controls (MOEs at various application rates range for engineering controls or closed cabs from 215 to 854, all others were < 79). The 1.0 lb ai/acre rate required the use of single layer clothing, gloves and no respirator (MOE = 103). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved for application rates 1.5 lb ai/acre only with the use of engineering controls (MOEs at various application rates range for engineering controls or closed cabs from 188 to 745, all others were < 78). The 1.0 lb ai/acre rate required the use of single layer clothing, gloves and PF 5 respirator (MOE = 105). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs >100 were achieved for all application rates only with the use of engineering controls (MOEs using engineering controls range from 138 to 819, all others were < 86).

On Grapes The maximum application rate is 1.5 lb ai per acre and the typical application rate is 1 lb ai/acre. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at the 1.5 lb ai/acre application rate only with the use of engineering controls (MOEs at for engineering controls or closed cabs were 853, all others were < 79). The 1.0 lb ai/acre rate required the use of single layer clothing, gloves and no respirator (MOE = 103). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at the 1.5 lb ai/acre application rate only with the use of engineering controls (745, all others were < 78). The 1.0 lb ai/acre rate required the use of single layer clothing, gloves and PF 5 respirator (MOE = 105) or greater levels of personal protection. When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at both application rates with the use of

engineering controls (MOEs using engineering controls range from 546 to 819, all others were < 86).

On Field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels) The maximum application rates ranges from 0.7 to 1 lb ai per acre depending on crop and formulation. Typical application rates range from 0.4 lb ai per acre for cotton and 0.5 lb ai per acre for green peas up to the maximum allowable application rates for various crops (e.g., 0.7 lb ai per acre for alfalfa and 1 lb ai per acre for blueberries). When short-term dermal and inhalation exposures were combined, MOEs>100 could be achieved with the use of single layer clothing, gloves, and no respirator or greater levels of personal protection (MOE 103 to 1281). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 could be achieved with the use of single layer clothing, gloves, and a PF 5 respirator or greater levels of personal protection (MOE 105 to 1117). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 could not be achieved except for the use of engineering controls (MOE 819, all others < 86).

- **(4) applying sprays with a groundboom sprayer:**

On Grapes The maximum application rate is 1.5 lb ai per acre and the typical application rate is 1 lb ai/acre. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates ≤1.5 lb ai/acre at the baseline level of protection (MOEs at baseline range from 531 to 797). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates ≤1.5 lb ai/acre at the baseline level of protection (MOEs at baseline range from 409 to 613). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs1300 were achieved at all application rates ≤1.5 lb ai/acre at the baseline level of protection (MOEs at baseline range from 300 to 450).

On Field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels) The maximum application rates ranges from 0.7 to 1 lb ai per acre depending on crop and formulation. Typical application rates range from 0.4 lb ai per acre for cotton and 0.5 lb ai per acre for green peas up to the maximum allowable application rates for various crops (e.g., 0.7 lb ai per acre for alfalfa and 1 lb ai per acre for blueberries). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates ≤1.0 lb ai/acre at the baseline level of protection (MOEs at baseline range from 797 to 1922). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates ≤1.0 lb ai/acre at the baseline level of protection (MOEs at baseline range from 613 to 1533). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates ≤1.0 lb ai/acre at the baseline level of protection (MOEs at baseline range from 450 to 1124).

- **(5) applying sprays with a fixed-wing aircraft (also accounts for helicopter applications):**

Tree Fruit and Nut Crops: The maximum application rate is 1.5 to 5.95 lb ai per acre depending upon the crop (i.e., fruit trees such as pears are at a maximum rate of 5 lb ai/acre while various nut trees are at 5.95 lb ai/acre). Typical application rates range from 1.0 lb ai/acre for kiwi fruit to 3.1 lb ai/acre for walnuts. Tree fruit and nut crops also included in this range of application rates are apples, apricots, cherries, nectarines, peaches, pears, plums/prunes, almonds, and pecans. The use of engineering controls (a closed airplane cab) is the only logical application scenario. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates except the 5.95 lb ai/acre (MOEs range from 115 to 574, MOE at 5.95 rate is 97). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates except the 5.95 lb ai/acre (MOEs range from 105 to 528, MOE at 5.95 rate is 88). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were only achieved at application rates ≤3 lb ai/acre (MOEs range from 129 to 387, MOEs for all others ≤78).

Field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels): The maximum application rates ranges from 0.7 to 1 lb ai per acre depending on crop and formulation. Typical application rates range from 0.4 lb ai per acre for cotton and 0.5 lb ai per acre for green peas up to the maximum allowable application rates for various crops (e.g., 0.7 lb ai per acre for alfalfa and 1 lb ai per acre for blueberries). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates considered (MOEs range from 574 to 628). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates considered (MOEs range from 528 to 578). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates considered (MOEs range from 387 to 424).

- **(9) applying dusts post-harvest with a power duster to sweet potatoes:** The application rate is 0.0125 lb ai per 50 pound bushel. Commercial dusting equipment is used for applications. Typical application rates were unavailable. The formulation is a 5 percent dust. This summary is based on the label 10163-168. The frequency of application is anticipated to be less than 5 times per year (most crops are less than 2 times per year) for each treated crop. No exposure data were available to complete this assessment.

- **(16) flagging for aerial spray application:**

On Tree Fruit and Nut Crops The maximum application rate is 1.5 to 5.95 lb ai per acre depending upon the crop (i.e., fruit trees such as pears are at a maximum rate of 5 lb ai/acre while various nut trees are at 5.95 lb ai/acre). Typical application rates range from 1.0 lb ai/acre for kiwi fruit to 3.1 lb ai/acre for walnuts. Tree fruit and nut crops also included in this range of application rates are apples, apricots, cherries, nectarines, peaches, pears, plums/prunes, almonds, and pecans. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates 3 lb ai/acre only with engineering controls (MOEs range from 2072 to 4110, all others < 83). At rates ≤1.5 lb ai/acre rate, only the baseline level of personal protection is required (MOEs range from 164

to 247). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates 3 lb ai/acre only with engineering controls (MOEs range from 1739 to 3448, all others < 81). At rates ≤1.5 lb ai/acre rate, only the baseline level of personal protection is required (MOEs range from 138 to 207). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates 3 lb ai/acre only with engineering controls (MOEs range from 1275 to 2529, all others < 59). At rates ≤1.5 lb ai/acre rate, only the baseline level of personal protection is required (MOEs range from 101 to 152).

On grapes The maximum application rate is 1.5 lb ai per acre and the typical application rate is 1 lb ai/acre. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates with only the baseline level of personal protection (MOEs range from 164 to 247). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates with only the baseline level of personal protection (MOEs range from 138 to 207). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were also achieved with only the use of a baseline level of personal protection (MOEs range from 101 to 152).

On field, forage, fiber, small fruit, and vegetable crops (e.g., alfalfa, blueberries, cotton, peas, potatoes, sweet potatoes only on SLN labels) The maximum application rates ranges from 0.7 to 1 lb ai per acre depending on crop and formulation. Typical application rates range from 0.4 lb ai per acre for cotton and 0.5 lb ai per acre for green peas up to the maximum allowable application rates for various crops (e.g., 0.7 lb ai per acre for alfalfa and 1 lb ai per acre for blueberries). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates, including for cotton, considered at the baseline level of personal protection (MOEs range from 247 to 270). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates, including for cotton, considered at the baseline level of personal protection (MOEs range from 207 to 226). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved with only the use of a baseline level of personal protection (MOEs range from 152 to 166).

Risks For Occupational Direct Animal Treatments

- **(1a) mixing/loading liquids for high pressure handwand application:** The application rate is 0.4 to 2.0 lb ai per 100 gallons of spray (0.004 to 0.02 lb ai/gallon). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates with the use of single layer clothing, gloves, and no respirator (MOEs range from 1944 to 9722). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates with the use of single layer clothing, gloves, and no respirator (MOEs range from 1500 to 7500). Likewise, when intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at all application rates with the use of single layer clothing, gloves, and no respirator (MOEs range from 1100 to 5500).

- **(6) applying sprays with a high-pressure handwand:** The application rate is 0.4 to 2.0 lb ai per 100 gallons of spray (0.004 to 0.02 lb ai/gallon). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at the baseline level of personal protection for the low concentration application rate (MOE = 127) and with the use of double layer clothing, gloves, and a PF5 respirator at the highest application concentration (MOE = 127). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at the baseline level of personal protection for the low concentration application rate (MOE = 101) and with the use of double layer clothing, gloves, and a PF5 respirator at the highest application concentration (MOE = 101). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved for the low concentration application rate with the use of single layer clothing, gloves, and no respirator (MOE = 135). A risk level that did not exceed the Agency's level of concern could not be achieved for the high concentration application (MOEs ≤88).

- **(10) dusting an animal (veterinary uses only):** The application rate is 0.5 grams of formulated dust per kilogram of animal bodyweight. No exposure data were available to complete this assessment.

- **(11) dipping a dog (veterinary uses only):** The application rate is 0.0076 lb ai/gallon of dip solution. Application equipment is a pet dipping tank. No exposure data were available to complete this assessment.

- **(12) mixing/loading/applying with a cattle backrubber:** The application rate is 1 lb ai per 50 gallons of fuel oil. Application equipment is backrubber, soak sack, or cloth. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved at the baseline level of personal protection with a reminder that open mixing of liquids exposure data were used to complete this assessment and that the exposure data do not address the applicator aspect of the process that involves placement of the charged device (MOE = 362). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at the baseline level of personal protection with a reminder that open mixing of liquids exposure data were used to complete this assessment and that the exposure data do not address the applicator aspect of the process that involves placement of the charged device (MOE = 361). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved at the baseline level of personal protection with a reminder that open mixing of liquids exposure data were used to complete this assessment and that the exposure data do not address the applicator aspect of the process that involves placement of the charged device (MOE = 264).

- **(13a) mixing/loading/applying liquids with a backpack sprayer:** The application rate is 0.4 to 2.0 lb ai per 100 gallons of spray (0.004 to 0.02 lb ai/gallon). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator at each application concentration considered (MOEs 202 to 1010). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator at each application concentration considered (MOEs 188 to 938). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were also achieved using single layer clothing, gloves, and no respirator (MOEs 138 to 688).

- **(14a) mixing/loading/applying liquids with a low pressure handwand sprayer:** The application rate is 0.4 to 2.0 lb ai per 100 gallons of spray (0.004 to 0.02 lb ai/gallon). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator at each application concentration considered (MOEs 991 to 4952). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator at each application concentration considered (MOEs 719 to 3596). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOEs 527 to 2637).

Risks For Occupational Treatments on Ornamental and Residential Use Sites

- **(1a) mixing/loading liquids for a high pressure handwand and right-of-way sprayer applications:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. When short-term dermal and inhalation exposures were combined, the MOE >100 using a baseline clothing scenario (MOE = 121). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE using a baseline clothing scenario was 120. When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 7333).

- **(1b) mixing/loading liquids for airblast applications:** The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using an airblast sprayer and the emulsifiable concentrate. When short-term dermal and inhalation exposures were combined, the MOE >100 using a baseline clothing scenario (MOE = 121). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE using a baseline clothing scenario was 120. When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 7333).

- **(2a) mixing/loading wettable powders for aerial application in forestry (e.g., evergreens in large stands):** The application rate is 1 lb ai per acre. When short-term dermal and inhalation exposures were combined, the MOEs were <100 even when engineering controls were used (i.e., a level of no concern could not be achieved -- highest MOE was 40 for engineering controls). It should be noted that the engineering control considered in this

scenario is a water soluble packet and that actual (low confidence in PHED) data were used. Likewise, when intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the highest MOE achieved was 37 using engineering controls (i.e., a level of no concern could not be achieved). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were also never achieved for all risk mitigation options (i.e., highest MOE calculated was 27).

- **(2b) mixing/loading wettable powders for groundboom applications to non-crop areas (e.g., field perimeters):** The application rate is 1.5 to 2.0 lb ai per acre. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 168). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and a PF5 respirator (MOE = 205). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and a PF5 respirator (MOEs 150).

- **(2c) mixing/loading wettable powders for airblast applications (e.g., tree surgeon type uses):** The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using an airblast sprayer and the emulsifiable concentrate. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 1117). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 583). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 428).

- **(2d) mixing/loading wettable powders for high pressure handwand and right-of-way sprayer applications:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 1117). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 583). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and no respirator (MOE = 428).

- **(2e) mixing/loading wettable powders for pine seedling dips:** The application rate is 1.75 lb ai per 5 gallons of dip (5 gallons of dip treats 10,000 seedlings). When short-term dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and a PF5 respirator (MOE = 151). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and a PF5 respirator (MOE = 117). When intermediate-term (>30 days) dermal and inhalation exposures were combined, MOEs>100 were achieved using single layer clothing, gloves, and a PF10 respirator or greater levels of personal protection (MOE = 103).

- **(3) applying sprays with an airblast sprayer:** The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using an airblast sprayer and the emulsifiable concentrate. When short-term dermal and inhalation exposures were combined, the MOE was >100 (933) using a baseline level of personal protection. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (864) using a baseline level of personal protection. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was 100 (634) using a baseline level of personal protection.

- **(4) applying sprays with a groundboom sprayer to non-crop areas (e.g., field perimeters):** The application rate is 1.5 to 2.0 lb ai per acre. When short-term dermal and inhalation exposures were combined, the MOE was >100 (3188) using a baseline level of personal protection. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (2453) using a baseline level of clothing. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was also >100 (1799) using a baseline level personal protection.

- **(5) aerial application of sprays in forestry (e.g., evergreens in large stands):** The application rate for commercial crops is 1 lb ai per acre. The use of engineering controls (a closed airplane cab) is the only logical application scenario. When short-term dermal and inhalation exposures were combined, the MOE was >100 (167). When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (154). When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (113).

- **(6) applying sprays with a high-pressure handwand:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using an airblast sprayer and the emulsifiable concentrate. When short-term dermal and inhalation exposures were combined, the MOE was >100 (170) using a baseline level of personal protection. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (135) using a baseline level of personal protection. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (180) using a single layer of clothing, gloves, and no respirator.

- **(7) applying sprays with a right-of-way sprayer:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using an airblast sprayer and the emulsifiable concentrate. When short-term dermal and inhalation exposures were combined, the MOE was >100 (267) using a baseline level of personal protection. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (261) using a baseline level of personal protection. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (192) also at a baseline level of

personal protection.

- **(8) dipping pine seedlings:** The application rate is 1.75 lb ai per 5 gallons of dip (5 gallons of dip treats 10,000 seedlings). No data were available to complete this assessment. This should be considered in the interpretation of this overall use pattern as the mixing/loading component only was considered in scenario 2e above (i.e., the risks attributable to mixining represent only a portion of the total risks associated with this use pattern and the remainder for dipping have not been quantified but should be qualitatively considered).

- **(13a) mixing/loading/applying liquids with a backpack sprayer:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using the emulsifiable concentrate. When short-term dermal and inhalation exposures were combined, the MOE was >100 (1346) using single layer clothing, gloves, and no respirator. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (1250) using single layer clothing, gloves, and no respirator. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (917) also using single layer clothing, gloves, and no respirator.

- **(13b) mixing/loading/applying wettable powders with a backpack:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations.The application rate is 3 lb ai per 50 gallons (0.06 lb ai/gallon) of water when using the emulsifiable concentrate. When short-term dermal and inhalation exposures were combined, the MOE was >100 (1346) using single layer clothing, gloves, and no respirator. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (1250) using single layer clothing, gloves, and no respirator. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (917) also using single layer clothing, gloves, and no respirator.

- **(14a) mixing/loading/applying liquids with a low pressure handwand sprayer:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. When short-term dermal and inhalation exposures were combined, the MOE was >100 (6604) using single layer clothing, gloves, and no respirator. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (4795) using single layer clothing, gloves, and no respirator. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (3516) also using single layer clothing, gloves, and no respirator.

- **(14b) mixing/loading/applying wettable powders with a low pressure handwand:** The application rate is 0.75 lb ai per 100 gallons of water (0.0075 lb ai/gallon) for handheld equipment with applications of up to 10 gallons of spray per tree for all types of formulations. When short-term dermal and inhalation exposures were combined, the MOE was >100 (285) using single layer clothing, gloves, and no respirator. When intermediate-term (>7 & ≤30

days) dermal and inhalation exposures were combined, the MOE was >100 (179) using single layer clothing, gloves, and no respirator. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (131) also using single layer clothing, gloves, and no respirator.

- **(15) mixing/loading/applying soluble concentrates to fire ant mounds.** Specialized fire ant control applications are also allowed using the soluble concentrate formulation (10163-174). The application rate is specified as a single "fireban packet for each square foot of mound" where each packet contains 32 grams of a 12.5 percent material (i.e., 4 grams or 0.009 pounds of active ingredient per ft^2 of mound in 2 gallons of water). The risk values presented below should be considered with the fact that these values were calculated using hose-end sprayer data to represent this scenario which is considered by the Agency to roughly approximate the exposures individuals would receive in this kind of application event. When short-term dermal and inhalation exposures were combined, the MOE was >100 (158) using a baseline level of personal protection. When intermediate-term (>7 & ≤30 days) dermal and inhalation exposures were combined, the MOE was >100 (157) using a baseline level of personal protection. When intermediate-term (>30 days) dermal and inhalation exposures were combined, the MOE was >100 (115) also using a baseline level of personal protection.

iii. Residential (Homeowner) Handler Risk Summary

In this current assessment, which is based on a different approach from the previous assessments completed for phosmet, risks for handlers were assessed using separate toxicological endpoints for both dermal and inhalation exposures. The resulting risks (MOE values) were then added in order to obtain an overall risk value that accounted for both dermal and inhalation exposures. The Agency does not believe that the use of personal protective equipment is appropriate for homeowner handlers because it is not believed that a homeowner will purchase and use gloves and/or respirators when required by labels. Further, the proper use of respirators requires professional training and medical clearance for pulmonary function. Improper use of a respirator may increase pesticide use risk due to pulmonary function complications. In order to ensure complete stewardship, the Agency completed the risk assessment for residential (homeowner) applicators wearing shorts and a t-shirt, because it is a likely exposure scenario.

Calculations & Results Presentation All of the risk calculations for residential handlers completed in this assessment are included in Appendix B. The specifics of each of table included in Appendix B are described below as well as a summary of the risks for each exposure scenario.

- **Table 1: Sources of Exposure Data Used in the Residential Phosmet Handler Exposure and Risk Calculations** Describes the sources of the exposure data used in all of the handler calculations.

- **Table 2: Input Parameters For Phosmet Residential Handler Exposure and Risk Calculations** Presents the exposure values and other exposure factors used in the handler risk assessments.

- **Table 3: Phosmet MOEs Attributable To Combined Short-Term Homeowner Handler Dermal And Inhalation Exposures** Presents the risks (MOEs) for residential handlers when applications are made wearing short pants and short-sleeved shirts with no respiratory protection. The application rates and amount handled are different from analogous occupational application scenarios because homeowners are expected to have less area available to treat.

Each of the tables of Appendix B illustrate how the calculations were performed to define the risks (i.e., MOEs) for residential phosmet handlers. The exposure data and exposure factors represent the best sources of data currently available to the Agency for completing these kinds of assessments. For example, maximum application rates were derived directly from phosmet labels. Exposure factors (e.g., body weight, amount treated per day, protection factors, etc.) are all standard values that have been used by the Agency over several years and are derived from peer reviewed sources whenever possible (e.g., Exposure Factors Handbook) and the PHED unit exposure values are the best available estimates of exposure. Some PHED unit exposure values are high quality while others represent low quality, but the best available, data.

The risks are summarized based on the specific markets for phosmet use. The level of concern for all assessments is established by an uncertainty factor of 100. Intermediate-term exposures are not expected and therefore not considered in this assessment (>30 days in this case because all others $\leq$30 days are calculated with the 21 day dermal endpoint).

Risks For Residential (homeowner) Direct Animal Treatments

(1) dusting an animal (1 dog treated): only dermal exposures were assessed for this scenario as no inhalation data were available (i.e., based on residential SOP scenario), the MOEs for dermal exposure ranged from 159000 to 3.75 million for small and large dogs, respectively, the magnitude of these MOE values should be considered in the evaluation of this exposure scenario given the lack of exposure data.

(2) dipping an animal (1 dog treated): only dermal exposures were assessed for this scenario as no inhalation data were available (i.e., based on residential SOP scenario), the MOEs for dermal exposure are 1.4 million, the magnitude of this MOE should be considered in the evaluation of this exposure scenario even given the lack of data.

Risks For Residential (homeowner) Uses on Terrestrial Crops

(3b) mixing/loading/applying wettable powders with a backpack sprayer to peas, potatoes, and fruit trees: Combined dermal and inhalation MOEs for peas, potatoes, and fruit trees were, respectively: 11218, 11218, and 2060. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

(4b) mixing/loading/applying wettable powders with a low pressure handwand sprayer to peas, potatoes, and fruit trees: Combined dermal and inhalation MOEs for peas, potatoes, and fruit trees were, respectively: 230, 230, and 42. Only the risks for peas and potatoes in this scenario did not exceed the Agency's level of concern. Risks for the other crops do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

(5b) mixing/loading/applying wettable powders with a hose-end sprayer to peas, potatoes, and fruit trees: Combined dermal and inhalation MOEs for peas, potatoes, and fruit trees were, respectively: 1942, 1942, and 357. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

Risks For Residential (homeowner) Treatments on Ornamentals

(3a) mixing/loading/applying liquids with a backpack sprayer to ornamentals: The combined dermal and inhalation MOE was 5385. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

(3b) mixing/loading/applying wettable powders with a backpack sprayer to ornamentals: The combined dermal and inhalation MOE was 4039. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

(4a) mixing/loading/applying liquids with a low pressure handwand sprayer to ornamentals: The combined dermal and inhalation MOE was 280. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

(4b) mixing/loading/applying wettable powders with a low pressure handwand sprayer to ornamentals: The combined dermal and inhalation MOE was 83. Risks exceed the Agency's level of concern for this scenario.

(5a) mixing/loading/applying liquids with a hose-end sprayer to ornamentals: The combined dermal and inhalation MOE was 932. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

(5b) mixing/loading/applying wettable powders with a hose-end sprayer to ornamentals: The combined dermal and inhalation MOE was 700. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

(6) mixing/loading/applying soluble concentrates to fire ant mounds to ornamentals:

The combined dermal and inhalation MOE was 389. Risks do not exceed the Agency's level of concern in any of the calculations completed for this scenario.

iv. Occupational Risks From Postapplication Exposures

As indicated in Section 2.b above, the Agency assessed risks for 4 postapplication exposure scenarios using chemical-specific dislodgeable foliar residue dissipation data and surrogate transfer coefficients for harvesting various crops. Restricted entry intervals (REIs) are used by the Agency to regulate postapplication exposures because the Agency believes they are the most appropriate risk mitigation option for postapplication exposures. Requirements for additional clothing and personal protective equipment are not believed to be appropriate due to practical considerations (e.g., maintenance, enforcement, and other risk/stress factors such as heat exhaustion). Also, engineering controls are not considered practical in all but the most specialized scenarios because they are generally not available for mitigating postapplication risks.

Calculation & Results Presentation All of the risk calculations for occupational post-application exposures are included in Appendix C. The specifics of each of table included in Appendix C are described below as well as a summary of the risks for each exposure scenario.

- **Table 1 : Dislodgeable Foliar Residue Data for Oranges Excerpted From MRID 404253-01** Presents the actual dislodgeable foliar residue data for oranges. The registrant has proposed deleting the label for use on citrus. As such, these data are presented only for informational purposes.

- **Table 2 : Dislodgeable Foliar Residue Data for Pears Excerpted From MRID 404253-01** Presents the actual dislodgeable foliar residue data for pears used to assess the occupational exposures for pear harvesting and for apple harvesters (after proportionally calculating regionally based application rates).

- **Table 3 : Dislodgeable Foliar Residue Data for Grapes Excerpted From MRID 404253-01** Presents the actual dislodgeable foliar residue data for grapes used to assess the occupational exposures for grape harvesting and for harvesting on low row crops.

- **Table 4: Dislodgeable Foliar Residue Levels Used In the Calculation of Restricted Entry Intervals** Presents dislodgeable foliar residue levels that have been used for risk assessment purposes. The pear data presented in table 2 have been adjusted based on application rates for other crops such as nut trees and apples in different regions. All values are based on total residues (phosmet and phosmet oxon residues).

- **Table 5: Dose Levels Used In the Calculation of Restricted Entry Intervals** Presents the dose levels that were calculated for determination of the MOEs which are the basis of the REI determination. Daily dose levels represent potential dose while the monthly average dose levels represent absorbed dose values as a dermal absorption factor has been applied.

- **Table 6: Restricted Entry Intervals For Risks On Pears, Grapes, Low Row Crops, and Apples** Presents the risk values (MOEs) upon which REIs are determined. These are based

on a calculation of daily exposures using dissipation data and the 21 day dermal toxicity endpoint. Risks over 30 day intervals have also been calculated and included in this table using the chronic feeding study endpoint for additional characterization purposes and to address that very small segment of the population that might exposed to phosmet over such an extended duration.

Registrant Proposal As a basis for considering the post-application exposures and REIs calculated in this assessment, it should be noted that the registrant earlier proposed the following REIs for phosmet based on a toxicological endpoint (rabbit dermal toxicity study with a NOAEL of 100 mg/kg/day) that was not selected by the Agency and essentially the same exposure dataset that was used in the Agency risk assessment. [Note: The registrant also later submitted a probabilistic post-application risk assessment. This assessment was not considered in the phosmet RED chapter because the Agency has not yet developed and finalized a policy for reviewing these types of assessments]. The REIs proposed by the registrants in their earlier risk assessment were:

- **Oranges:** 66 days (presented only for information purposes);
- **Pears:** 25 days; and
- **Grapes:** 8 days.

Occupational Postapplication Risks The Agency calculated post-application risks by considering five distinct exposure scenarios (represented by different transfer coefficients) that relate to the cultural practices and chemical use patterns associated with the use of phosmet in agriculture and on ornamentals. The scenarios that were considered in this assessment range from relatively high exposure activities such as harvesting tree fruits (e.g., pears and apples) and grapes to lower exposure activities such as scouting in cotton or harvesting low row crops. In exposure scenario #1, the Agency also considered a variety of application rates that are reflective of the tree crops upon which phosmet is used (i.e., nuts, pears, and apples on the east and west coasts). These assessments were completed with the same dislodgeable foliar residue data and transfer coefficients that were used by the registrant in their risk assessment. The key difference between the Agency assessment and the registrant assessment was that the registrant used a NOAEL (100 mg/kg/day) defined with a dermal rabbit study and the Agency used a rat dermal toxicity study (NOAEL 15/mg/kg/day) which accounts for a 6.7x factor in the results of the risk assessment. [Note: The Agency used the pear dissipation data (after proportional adjustment based on application rates) to calculate REIs for nuts and apples on the east and west coasts. The grape dissipation data were coupled with a different transfer coefficient to calculate an REI for all other crops.]

The time it takes for residues to dissipate to a level when accompanying exposures are 100 is the amount of time that would be proposed as a Restricted Entry Interval. These values were calculated using daily exposures and comparing the results to the NOAEL from the 21 day dermal toxicity study in rats. The durations of time required for residues to dissipate where exposures do not exceed the Agency's level of concern (i.e., the REI) are summarized below for each scenario:

- **Occupational Scenario 1/Harvesting nuts at 5.95 lb ai/acre:** 58 days (chemical-specific data extrapolated from pears to nuts and adjusted for application rate differences coupled with a high exposure transfer coefficient of 10,000 cm^2/hour commonly used by the Agency);

- **Occupational Scenario 1/Harvesting pears at 5 lb ai/acre:** 56 days (site- and chemical-specific data coupled with a high exposure transfer coefficient of 10,000 cm^2/hour commonly used by the Agency);

- **Occupational Scenario 1/Harvesting apples on the west coast at 4 lb ai/acre:** 52 days (chemical-specific data extrapolated from pears to apples and adjusted for application rate differences coupled with a high exposure transfer coefficient of 10,000 cm^2/hour commonly used by the Agency);

- **Occupational Scenario 1/Harvesting apples on the east coast at 1.5 lb ai/acre:** 37 days (chemical-specific data extrapolated from pears to apples and adjusted for application rate differences coupled with a high exposure transfer coefficient of 10,000 cm^2/hour commonly used by the Agency);

- **Occupational Scenario 2/Harvesting grapes at 1 lb ai/acre):** 44 days (site- and chemical-specific data coupled with a high exposure transfer coefficient of 15,000 cm^2/hour commonly used by the Agency);

- **Occupational Scenario 3/Harvesting blueberries at 1 lb ai/acre):** 25 days (chemical-specific data extrapolated from grapes to blueberries coupled with a medium exposure transfer coefficient of 4,000 cm^2/hour commonly used by the Agency);

- **Occupational Scenario 4/Harvesting peas at 1 lb ai/acre):** 18 days (chemical-specific data extrapolated from grapes to blueberries coupled with a medium exposure transfer coefficient of 2,500 cm^2/hour commonly used by the Agency); and

- **Occupational Scenario 5/Scouting various crops at 1 lb ai/acre):** 4 days (chemical-specific data extrapolated from grapes to blueberries coupled with a low exposure transfer coefficient of 1,000 cm^2/hour commonly used by the Agency).

To support the REIs that were calculated using daily exposures over both short- and intermediate-term (≤30 days) exposures, the Agency also calculated post-application MOEs using 30 day time-weighted averages for three time intervals. In all cases, the results of this assessment support the REIs calculated above. The following table presents risks calculated using 30 day average exposure values and the endpoint from the chronic feeding study in rats. Three 30 day post-application intervals were considered including 0 to 30 days, 15 to 45 days, and 30 to 60 days after application. This type of calculation was completed for the occupational assessment to support the calculation of the REIs using daily exposures completed above and because it is likely that a very small segment of the exposed population may be exposed over an extended duration (e.g., apple or pear harvesting). It should also be noted that the available DFR dissipation indicate that residues persist for at least one month (based on the data presented in Tables 1 through 3) and that the residues at that interval were orders of magnitude higher than the limit of quantification in the study even at the longer sampling durations. These MOEs are summarized in the following table:

Interval	MOEs For Each Crop Considered (based on monthly average exposures)							
	Scen 1 Nut Harvest	Scen 1 Pear Harvest	Scen 1 West Coast Apple Harvest	Scen 1 East Coast Apple Harvest	Scen 2 Grape Harvest	Scen 3 Blueberry Harvest	Scen 4 Harvest Peas	Scen 5 Scouting
0 to 30 days	4	4	5	15	9	33	53	132
15 to 45 days	10	12	15	39	24	91	146	365
30 to 60 days	27	32	40	106	68	254	406	1014

v. Residential Risks From Postapplication Exposures

The use of a Restricted Entry Interval (REI) is not an appropriate method of risk mitigation for residential use chemicals and, essentially, for all exposure scenarios where there is the potential for unrestricted general population exposures. As a result, the approach used to evaluate residential risks is to consider exposures immediately after application as these represent higher risks which are a concern for acutely toxic compounds like the organophosphates.

Residential risks were assessed for both adults and toddlers based on guidance provided in the *SOPs For Residential Exposure Assessment* and the *Draft: Series 875-Occupational and Residential Exposure Test Guidelines, Group B-Postapplication Exposure Monitoring Test Guidelines (7/24/97 Version)*. The Agency considered several populations and exposure scenarios in this residential postapplication risk assessment as phosmet can be used in a variety of ways that might potentially create a risk for a residential population. A home garden setting based on pear tree harvesting/maintenance and pet treatments were selected by the Agency as scenarios that are representative of phosmet risks in a residential environment. For the home and garden use scenario, the Agency used the scneario-/chemical-specific exposure and dislodgeable foliar residue data on pears to calculate risks for pear harvesting activities. Risks in home garden scenarios were assessed for adults and children aged 10 to 12 that might reasonably be expected to participate in these activities. Residential risks attributable to nondietary ingestion and dermal exposure were also assessed for toddlers after contact with treated pets based on the guidance provided in the *SOPs For Residential Exposure Assessment* (e.g., 20 percent of the per animal application is considered transferable while 10 percent of the transferable amount is used to represent dermal dose). One notable exception to the Residential SOPs included allowing for a moderate residue dissipation rate of 5 percent per day on treated pets (supported by Chambers, 1999). Risks were assessed using small and larger pets as the application rates varied based on the size of the treated animals.

Calculation & Results Presentation All residential post-application risk calculations completed for adults and children are presented in Appendix D of this document. The specifics of each table included in Appendix D are described below:

- **Table 1 : Dislodgeable Foliar Residue Data for Pears Excerpted From MRID 404253-01** Presents the actual dislodgeable foliar residue data for pears used to assess the residential exposures for pear harvesting and maintenance (same data as presented in Appendix C/Table 2). Both phosmet and phosmet oxon residue levels are presented.

- **Table 2: Empirical Dermal Exposure Data For Homeowners From MRID 401223-01 and Transfer Coefficient Calculation Based on MRID 404253-01** Presents the calculations that determined the transfer coefficients used to assess the post-application residential exposures for adults and youth-aged children. The calculations are based on the presence of phosmet and phosmet oxon residues.

- **Table 3: MOEs Attributable To Dermal Exposure For Adults Involved In The Harvesting And Maintaining Of Pears and Apples** Presents the MOEs that were calculated for the post-application dermal exposures of adults involved in harvesting and maintenance of pears and apples in a residential setting. Daily and also monthly average (for characterization only) exposures/MOEs are presented. The calculations are based on the presence of phosmet and phosmet oxon residues.

- **Table 4: MOEs Attributable To Dermal Exposure For Youth-aged Children Involved In The Harvesting And Maintaining Of Pears and Apples** Presents the MOEs that were calculated for the post-application dermal exposures of youth-aged children involved in harvesting and maintenance of pears and apples in a residential setting. Daily and also monthly average (for characterization only) exposures/MOEs are presented. The calculations are based on the presence of phosmet and phosmet oxon residues.

- **Table 5: Risks Attributable to Dermal Contact With Phosmet Treated Pets (Dogs)** Presents the MOEs that were calculated for the post-application exposures due to dermal contact with treated dogs as described in the Agency's *SOPs For Residential Exposure Assessment*. Daily and also monthly average exposures/MOEs are presented. The calculations are based only on the presence of phosmet residues. Phosmet oxon residues have not been considered in this assessment.

- **Table 6: Toddler Risks Attributable to Hand-To-Mouth Activity After Contact With Phosmet Treated Pets (Dogs)** Presents the MOEs that were calculated for the post-application nondietary ingestion exposures of children due to hand-to-mouth activity after contact with treated dogs as described in the Agency's *SOPs For Residential Exposure Assessment*. Daily and also monthly average exposures/MOEs are presented. The calculations are based only on the presence of phosmet residues. Phosmet oxon residues have not been considered in this assessment.

- **Table 7: Toddler Risks Attributable to Dermal Contact With Treated Pets Along With Hand-To-Mouth Activity After Contact With Phosmet Treated Pets (Dogs)** Presents the MOEs that were calculated for an aggregate exposure that included post-application nondietary ingestion exposures due to hand-to-mouth activity after contact with treated dogs and dermal exposures after contact with treated pets. Daily also monthly average exposures/MOEs are presented. The calculations are based only on the presence of phosmet residues. Phosmet oxon residues have not been considered in this assessment.

Residential Postapplication Risks As indicated above, the use of an REI as a mitigation tool in residential settings is not considered appropriate by the Agency because it is not believed that an administrative mitigation measure like the REI is applicable for general population exposures.

Therefore, the approach used by the Agency to manage the risks of chemicals used in the residential environment attributable to post-application exposure is to determine if their use is acceptable on the day of application. The MOEs are presented below for each type of exposure considered. MOE values are presented for the day of application and the day after application, if achieved within 30 days after application (i.e., the interval where retreatment is likely), where the risks do not exceed the Agency's level of concern. These values (time when a MOE > 100) calculated for short-term and intermediate-term (≤30 days) exposures are as follows:

- **Adults Harvesting and Maintaining Pears (at 5 lb ai/acre):** Day_0 MOE = 62 and the MOE 100 at 8 days after application.

- **Adults Harvesting Apples On The West Coast (at 4 lb ai/acre):** Day_0 MOE = 78 and the MOE 100 at 4 days after application.

- **Adults Harvesting Apples On The East Coast (at 1.5 lb ai/acre):** Day_0 MOE = 207.

- **Youth-Aged Children Harvesting and Maintaining Pears (at 5 lb ai/acre):** Day_0 MOE = 69 and the MOE 100 at 6 days after application.

- **Youth-Aged Children Harvesting Apples On The West Coast (at 4 lb ai/acre):** Day_0 MOE = 87 and the MOE 100 at 3 days after application.

- **Youth-Aged Children Harvesting Apples On The East Coast (at 1.5 lb ai/acre):** Day_0 MOE = 232.

- **Toddlers Petting Small Dogs:** Day_0 MOE = 9 and MOEs are never 100 even up to 30 days after application.

- **Toddlers Petting Large Dogs:** Day_0 MOE <1 and MOEs are never 100 even up to 30 days after application.

- **Toddlers Exposed Through Hand-to-Mouth Behavior After Contact With Small Dogs:** Day_0 MOE = 1 and MOEs are never 100 even up to 30 days after application.

- **Toddlers Exposed Through Hand-to-Mouth Behavior After Contact With Large Dogs:** Day_0 MOE <1 and MOEs are never 100 even up to 30 days after application.

- **Aggregate Exposures Of Toddlers From Petting Dogs And Through Hand-to-Mouth Behavior After Contact With Small Dogs:** Day_0 MOE = 1 and MOEs are never 100 even up to 30 days after application.

- **Aggregate Exposures Of Toddlers From Petting Dogs And Through Hand-to-Mouth Behavior After Contact With Large Dogs:** Day_0 MOE <1 and MOEs are never 100 even up to 30 days after application.

To support the assessments presented above in which daily exposures for both short- and intermediate-term (≤30 days) exposures were calculated, the Agency also calculated post-application MOEs using 30 day time-weighted averages even though the Agency believes that these exposure scenarios are extremely unlikely (i.e., they were completed for risk characterization purposes). It should also be noted that available residue dissipation data indicate phosmet residues are somewhat persistent and it would not be unexpected to observe quantifiable phosmet residues 30 days after an application (i.e., as indicated in the DFR dissipation data, Appendix D/Table 1 based on the results of the dog fur dissipation study completed by Dr. Janice Chambers, 1999). These intermediate-term (>30 days) MOEs are summarized in the following table:

Population	MOEs For Each Scenario Considered (based on monthly average exposures)					
	Pears (Harvesting)	Apples (Harvesting on West Coast)	Apples (Harvesting on East Coast)	Petting Dogs (small& large)	Hand-to-Mouth From Dogs (small & large)	Aggregate From Dog Use
Adults	104	130	346	N/A	N/A	N/A
Youth-Aged Children	116	145	387	N/A	N/A	N/A
Toddlers	N/A	N/A	N/A	13 & <1	Both <1	Both <1

Note: "Small" and "Large" represent the dog sizes considered in the assessment.

vi. Incident reports

The incident report completed for this assessment is not included in this document. The report has been developed under a separate memo by Dr. Jerome Blondell of the Office of Pesticide Programs. This report as well as the results of this risk assessment are considered in the overall risk assessment for phosmet.

vii. Overall risk summary

The Agency has several concerns over the use of phosmet in a variety of marketplaces (i.e., agriculture, for direct animal treatments, and for ornamentals), particularly related to any use that can result in a residential exposure. The occupational handler risks can be mitigated in large part with additional protective measures such as personal protective equipment and/or engineering controls. No data were submitted for the handler aspect of the risk assessment.

Risk values for postapplication exposures (i.e., those that will be used to propose Restricted Entry Intervals - REIs) have also been recalculated for various crops and activities that are thought to be representative of the exposures associated with phosmet. Generally, the risk levels indicate that tree crops (i.e., nuts, pears, and apples at the highest rate considered) have REIs that are greater than 50 days with the exception of apples on the East Coast were the maximum application rate is decidely lower than for the other tree crops considered. For grapes, the proposed REI for each activity considered is 44 days. For low crops and caneberries, REIs ranged from 18 to 25 days. A low exposure activity (i.e., scouting low row crops and early season cotton) was also considered. The proposed REI for this scenario is 4 days. These calculations were based on chemical-specific dislodgeable foliar residue data. The Agency also completed an assessment for intermediate-term exposures that are greater than 30 days because the Agency does not have the use and usage data required to completely eliminate this exposure scenario from consideration. The Agency, however, does not believe this is a likely exposure scenario because of the way phosmet is used and also believes that any populations who are exposed in this manner would be small groups of professional applicators or farmworkers. The results for these extended duration calculations, however, support the proposed REI durations presented above.

The residential handler risks are generally not a concern to the Agency except for some wettable powder uses. In contrast, all residential post-application exposure scenarios are, however, of concern to the Agency with the exception of maintaining and harvesting apples on the east coast (i.e., at the maximum application rate on the east coast of 1.5 lb ai/acre). The risk values calculated for all exposure scenarios involving children in this assessment indicate MOEs that exceed the Agency's level of concern in all cases.

APPENDIX A: OCCUPATIONAL HANDLER RISK ASSESSMENT FOR PHOSMET

Appendix A/Table 1: Sources of Exposure Data Used In The Occupational Phosmet Handler Exposure And Risk Calculations			
Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Mixer/Loader Descriptors			
Mixing/Loading Liquid Formulations (1a/1b)	PHED V1.1 (May 1997 Surrogate Table)	1,000 gallons for livestock spraying and dipping; 40 trees and 100 gallons per tree for spraying shade trees and orchards with an airblast sprayer, high pressure handwand and rights of way sprayer.	**Baseline:** Hands, dermal, and inhalation = acceptable grades. Hands = 53 replicates; Dermal = 71 to 121 replicates; and Inhalation = 85 replicates. High confidence in hand, dermal, and inhalation data. No protection factor was needed to define the unit exposure value. **PPE:** The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 59 replicates. High confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls:** Hands, dermal, and inhalation = acceptable grades. Hands = 31 replicates; Dermal = 16 to 22 replicates; and Inhalation = 27 replicates. High confidence in hand, dermal, and inhalation data. **Gloves were used coupled with engineering controls since empirical data without gloves were not available and back calculation of gloves to a no glove scenario is believed to give erroneously high estimates**.
Mixing/Loading Wettable Powder Formulations (2a/2b/2c/2d/2e)	PHED V1.1 (May 1997 Surrogate Table)	350 acres for aerial and chemigation; 1,200 acres for aerial (northwest forests -- believed to be an acceptable analogy for forestry application scenarios); 80 acres for groundboom; 40 acres and 40 trees (100 gallons per tree) for airblast sprayer; 40 trees and 10 gallons per tree for high pressure handwand and rights of way sprayer, and 100 gallons for pine seedling dip.	**Baseline:** Hands, dermal, and inhalation = ABC grades. Hands = 7 replicates; Dermal = 22 to 45 replicates, and Inhalation = 44 replicates. Low confidence in the dermal/hands data due to the low number of hand replicates. Medium confidence in inhalation data. No protection factor was needed to define the unit exposure value. **PPE:** The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = ABC grades. Hands = 24 replicates. Medium confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls**: Hand, inhalation, and dermal = ABC grade. Hands = 5 replicates; dermal = 6 to 15 replicates; and inhalation = 12 replicates. Low confidence in the hand, dermal, and inhalation data. No protection factor was needed to define the unit exposure value. Engineering controls are water soluble packets.

Appendix A/Table 1: Sources of Exposure Data Used In The Occupational Phosmet Handler Exposure And Risk Calculations			
Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Applicator Descriptors			
Applying Sprays with an Airblast Sprayer (3)	PHED V1.1 (May 1997 Surrogate Table)	40 acres and 40 trees (100 gallons per tree) for airblast sprayer	**Baseline:** Dermal and inhalation = acceptable grades. Hands = ABC grades. Hands = 22 replicates, dermal = 32 to 49 replicates, and inhalation = 47 replicates. High confidence in dermal and inhalation data. Medium confidence in hand data. No protection factor was needed to define the unit exposure value. **PPE:** The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 18 replicates. High confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls:** Hands and dermal = acceptable grade, and inhalation = ABC grade. **Gloves were used coupled with engineering controls since empirical data without gloves were not available and back calculation of gloves to a no glove scenario is believed to give erroneously high (130µg/lb ai) estimates for a closed cab scenarios.** Hands= 20 replicates; dermal = 20 to 30 replicates; and inhalation = 9 replicates. High confidence in hand and dermal data. Low confidence in inhalation data (based on low replicates).
Applying Sprays with a Groundboom Sprayer (4)	PHED V1.1 (May 1997 Surrogate Table)	80 acres	**Baseline**: Hand, dermal, and inhalation = acceptable grades. Hands =29 replicates, dermal = 23 to 42 replicates, and inhalation = 22 replicates. High confidence in hand, dermal, and inhalation data. High confidence in dermal, hands, and inhalation data. No protection factors were needed to define the unit exposure values. **PPE:** The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = ABC grades. Hands = 21 replicates. Medium confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls**: Hand and dermal = ABC grade. Inhalation = acceptable grades. Hands = 16 replicates; dermal = 20 to 31 replicates; and inhalation = 16 replicates. Medium confidence in the hand and dermal data. High confidence in inhalation data. No protection factor needed to define the unit exposure value.
Applying Sprays with a Fixed-wing Aircraft (5)	PHED V1.1 (May 1997 Surrogate Table)	350 acres for most targets, 800 acres for cotton, and 1,200 acres for northwest forests (i.e., believed to be an acceptable analogy for forestry application scenarios)	**Engineering Controls:** Hands = acceptable grade, dermal and inhalation = ABC grade. Hands= 34 replicates, dermal = 24 to 48 replicates, and inhalation = 23 replicates. Medium confidence in dermal and inhalation data. High confidence in hand data. No protection factor was needed to define the unit exposure value. **Engineering controls are the only plausible exposure scenario for this application method as open-cab aircraft are not available and not considered a viable application tool.**

Appendix A/Table 1: Sources of Exposure Data Used In The Occupational Phosmet Handler Exposure And Risk Calculations			
Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Applying with a High Pressure Handwand (6)	PHED V1.1 (May 1997 Surrogate Table)	1,000 gallons for livestock; 40 trees and 10 gallons per tree.	**Baseline:** Hand, dermal, and inhalation = all grades. Hands = 2 replicates; dermal = 9 to 11 replicates; and inhalation = 11 replicates. Low confidence in hand, dermal, and inhalation data. No protection factor was needed to define the unit exposure values. **PPE:** The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = all grades. Hands = 9 replicates. Low confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls:** Not considered feasible for this exposure scenario.
Applying with a Rights-of-Way Sprayer (7)	PHED V1.1 (May 1997 Surrogate Table)	40 trees and 10 gallons per tree	**Baseline**: Dermal = ABC grades. Inhalation and hands = acceptable grade. Hands = 16 replicates; dermal = 4 to 20 replicates; and inhalation = 16 replicates. Low confidence in dermal data. High confidence in hand and inhalation data. No protection factors were needed to define the unit exposure values. **PPE**: The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 4 replicates. Medium confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls:** Not considered feasible for this exposure scenario.
Dipping Pine Seedlings (8)	No Data	No Data	No Data
Mixer/Loader/Applicator Descriptors			
Mixing/Loading/Applying with a Power Duster (9)	No Data	No Data	No Data
Dusting an Animal (10)	SOPs for Residential Exposure Assessments (7/97)	minimum dog weight (5 lbs) and maximum dog weight (120 lbs). 8 dogs are dusted.	The SOPs For Residential Exposure Assessment served as the basis for this assessment (i.e., the assumptions that were used to predict exposures from pet use products in which a percentage of the application rate is the predictor of potential dermal dose). The scenario is based on the use of a baseline clothing scenario. Calculations in which additional PPE are applied are not appropriate given the basis for the assessment. Additionally, the use of engineering controls are not considered feasible for this exposure scenario.
Dipping a Dog (11)	SOPs for Residential Exposure Assessments (7/97)	one gallon of dip/dog and 8 dogs are dipped.	The SOPs For Residential Exposure Assessment served as the basis for this assessment (i.e., the assumptions that were used to predict exposures from pet use products in which a percentage of the application rate is the predictor of potential dermal dose). The scenario is based on the use of a baseline clothing scenario. Calculations in which additional PPE are applied are not appropriate given the basis for the assessment. Additionally, the use of engineering controls are not considered feasible for this exposure scenario.
Mixing/Loading/Applying with a Cattle Back Rubber (12)	PHED V1.1 (May 1997 Surrogate Table)	40 gallons	No empirical data are available for this scenario. Instead, open mixing/loading of liquids data were used to complete this assessment. This assessment must be considered for use only as a rangefinder using extremely low confidence data because of the extrapolation that has been completed. See the risk characterization discussion presented in Section 4.b. For informational purposes only, a summary of the mixer/loader data are presented above (see 1a/1b above).

Appendix A/Table 1: Sources of Exposure Data Used In The Occupational Phosmet Handler Exposure And Risk Calculations

Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Mixing/Loading/Applying with a Backpack Sprayer (13a/13b)	PHED V1.1 (May 1997 Surrogate Table)	40 gallons; 100 gallons for livestock spraying	**Baseline:** Dermal and inhalation = acceptable grades. Hands = ABC grades. Dermal = 9 to 11 replicates; hands = 11 replicates; and inhalation = 11 replicates. Medium confidence in dermal and inhalation data. Low confidence in hand data. **The only empirical data that are available are based on the use of chemical-resistant gloves.** It is not appropriate to back-calculate a non-glove hand exposure level for this scenario as it is considered an overestimate of exposure. An extrapolation has also been completed for this scenario as the empirical data are based on the use of liquid formulations and these data have been used to also evaluate the mixer/loader/applicator backpack use of wettable powder formulations. **PPE:** The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls:** Not considered feasible for this exposure scenario.
Mixing/Loading/Applying Liquids with a Low Pressure Sprayer (14a)	PHED V1.1 (May 1997 Surrogate Table)	40 gallons; 100 gallons for livestock spraying	**Baseline:** Hands = all grades; dermal and inhalation = ABC grades. Dermal = 9 to 80 replicates; hands = 70 replicates; and inhalation = 80 replicates. Medium confidence in inhalation data. Low confidence in dermal and hand data. **PPE**: The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hand = 10 replicates. Hands= ABC grades Low confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls:** Not considered feasible for this exposure scenario.
Mixing/Loading/Applying Wettable Powders with a Low Pressure Sprayer (14b)	PHED V1.1 (May 1997 Surrogate Table)	40 gallons	**Baseline:** Dermal and inhalation= ABC grades; and hands = acceptable grades. Dermal = 16 replicates; hands = 15 replicates; and inhalation = 16 replicates. Medium confidence in inhalation, dermal, and hand data. The only empirical data that are available are based on the use of chemical-resistant gloves. It is not appropriate to back-calculate a non-glove hand exposure level for this scenario as it is considered an overestimate of exposure. **PPE**: The same data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls:** Not considered feasible for this exposure scenario.
Mixing/Loading/Applying Soluble Concentrates For Sprinkling (14b)	PHED V1.1 (May 1997 Surrogate Table)	12 - 2ft^2 fireant mounds	**Hose-end sprayer data were used to complete this assessment. This is a reasonable extrapolation of the existing data as the Agency believes the exposures that would occur would be similar for both kinds of applications.** **Baseline & PPE:** Very low confidence data. All available monitored data wer e collected using a short-pants and short-sleeved shirt clothing scenario. As a result, all values were calculated using an extrapolation based on the use of protection factors. See Appendix B/Table 1 for further information (Scenarios 5a/5b/6). **Engineering Controls:** Not considered feasible for this assessment.

Appendix A/Table 1: Sources of Exposure Data Used In The Occupational Phosmet Handler Exposure And Risk Calculations			
Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Flagger Descriptors			
Flagging Aerial Spray Applications (16)	PHED V1.1 (May 1997 Surrogate Table)	350 acres and 1,200 acres for northwest forests (i.e., believed to be an acceptable analogy for forestry application scenarios)	**Baseline:** Hands, dermal, and inhalation = acceptable grades. Dermal = 18 to 28 replicates; hands = 30 replicates; and inhalation = 28 replicates. High confidence in dermal, hand, and inhalation data. **PPE**: The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hand = acceptable grades. Hands= 6 replicates. Low confidence in hand data. Respirator protection factors of either 5 or 10 applied to account for the use of either dust/mist masks or cannister type devices (e.g., organic vapor removing half face device). **Engineering Controls**: The same data are used as for baseline coupled with a 90% protection factor to account for the use of an engineering control (e.g., sitting in a vehicle).

- All *Standard Assumptions* are based on an 8-hour work day as estimated by the Agency.
- All handler exposure assessments in this document are based on the "Best Available" data as defined by the PHED SOP for meeting Subdivision U Guidelines (i.e., completing exposure assessments). Best available grades are assigned to data as follows: matrices with A and B grade data (i.e., Acceptable Grade Data) and a minimum of 15 replicates; if not available, then grades A, B and C data and a minimum of 15 replicates; if not available, then all data regardless of the quality (i.e., All Grade Data) and number of replicates. High quality data with a protection factor take precedence over low quality data with no protection factor. Generic data confidence categories are assigned as follows:
  High = grades A and B and 15 or more replicates per body part
  Medium = grades A, B, and C and 15 or more replicates per body part
  Low = grades A, B, C, D and E or any combination of grades with less than 15 replicates.
- **PHED grading criteria do not reflect overall quality of the reliability of the assessment. Sources of the exposure factors should also be considered in the risk management decision.**
- In some cases, data are not applicable to the assessment (these are indicated in the following tables with NA) and in other cases, the scenario is not feasible because of physical constraints (these are indicated in the following tables with NF).

APPENDIX A/TABLE 2: INPUT PARAMETERS FOR PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		DERMAL UNIT EXPOSURES (mg/lb ai)					INHALATION UNIT EXPOSURES (ug/lb ai)			
			RATE	ACRES OR GALLONS	BASELINE	MIN PPE	MAX PPE	ENGINEERING CONTROL	GLOVE USE	NONE	PF5 RESPIRATOR	PF10 RESPIRATOR	ENG. CONTROL
OCCUPATIONAL MIXER/LOADERS													
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	0.004	1000	2.9	0.023	0.018	0.0086	Yes	1.2	0.24	0.12	0.083
		Livestock	0.02	1000	2.9	0.023	0.018	0.0086	Yes	1.2	0.24	0.12	0.083
		Ornamentals	0.0075	400	2.9	0.023	0.018	0.0086	Yes	1.2	0.24	0.12	0.083
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	0.06	50	2.9	0.023	0.018	0.0086	Yes	1.2	0.24	0.12	0.083
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	5.95	350	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Fruit Trees (e.g., pears)	5	350	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Fruit & Nuts	3	350	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Grapes, Vegetables, etc.	1.5	350	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Grapes, Tree Fruit, etc.	1	350	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Cotton	0.4	800	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Forestry	1	1200	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	2	10	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Grapes, Vegetables, etc.	1.5	80	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Grapes, Vegetables, etc.	1	80	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Cotton	0.4	80	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	5.95	40	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Fruit Trees (e.g., pears)	5	40	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Fruit & Nuts	3	40	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Grapes, Vegetables, etc.	1.5	40	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Grapes, Tree Fruit, etc.	1	40	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
		Ornamentals	0.06	50	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	0.0075	400	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24
2	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	0.35	100	3.7	0.17	0.13	0.021	No	43	8.6	4.3	0.24

APPENDIX A/TABLE 2: INPUT PARAMETERS FOR PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		DERMAL UNIT EXPOSURES (mg/lb ai)					INHALATION UNIT EXPOSURES (ug/lb ai)			
			RATE	ACRES OR GALLONS	BASELINE	MIN PPE	MAX PPE	ENGINEERING CONTROL	GLOVE USE	NONE	PF5 RESPIRATOR	PF10 RESPIRATOR	ENG. CONTROL
OCCUPATIONAL APPLICATORS													
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.95	40	0.36	0.24	0.22	0.019	Yes	4.5	0.9	0.45	0.45
		Fruit Trees (e.g., pears)	5	40	0.36	0.24	0.22	0.019	Yes	4.5	0.9	0.45	0.45
		Fruit & Nuts	3	40	0.36	0.24	0.22	0.019	Yes	4.5	0.9	0.45	0.45
		Grapes, Vegetables, etc.	1.5	40	0.36	0.24	0.22	0.019	Yes	4.5	0.9	0.45	0.45
		Grapes, Tree Fruit, etc.	1	40	0.36	0.24	0.22	0.019	Yes	4.5	0.9	0.45	0.45
		Ornamentals	0.06	50	0.36	0.24	0.22	0.019	Yes	4.5	0.9	0.45	0.45
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2	10	0.014	0.014	0.011	0.005	No	0.74	0.148	0.074	0.043
		Grapes, Vegetables, etc.	1.5	80	0.014	0.014	0.011	0.005	No	0.74	0.148	0.074	0.043
		Grapes, Vegetables, etc.	1	80	0.014	0.014	0.011	0.005	No	0.74	0.148	0.074	0.043
		Cotton	0.4	80	0.014	0.014	0.011	0.005	No	0.74	0.148	0.074	0.043
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	5.95	350	NF	NF	NF	0.005	No	NF	NF	NF	0.068
		Fruit Trees (e.g., pears)	5	350	NF	NF	NF	0.005	No	NF	NF	NF	0.068
		Fruit & Nuts	3	350	NF	NF	NF	0.005	No	NF	NF	NF	0.068
		Grapes, Vegetables, etc.	1.5	350	NF	NF	NF	0.005	No	NF	NF	NF	0.068
		Grapes, Tree Fruit, etc.	1	350	NF	NF	NF	0.005	No	NF	NF	NF	0.068
		Cotton	0.4	800	NF	NF	NF	0.005	No	NF	NF	NF	0.068
		Forestry	1	1200	NF	NF	NF	0.005	No	NF	NF	NF	0.068
6	Applying With a High Pressure Handwand	Livestock	0.004	1000	1.8	0.64	0.36	NF	NF	79	15.8	7.9	NF
		Livestock	0.02	1000	1.8	0.64	0.36	NF	NF	79	15.8	7.9	NF
		Ornamentals	0.0075	400	1.8	0.64	0.36	NF	NF	79	15.8	7.9	NF
7	Applying With a Right-of-Way Sprayer	Ornamentals	0.0075	400	1.3	0.39	0.29	NF	NF	3.9	0.78	0.39	NF
8	Dipping Pine Seedlings	Pine Seedlings	0.35	100	No Data	No Data	No Data	NF	NF	No Data	No Data	No Data	NF
OCCUPATIONAL MIXER/LOADER/APPLICATORS													
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	0.0125 lb ai/bu	No Data	No Data	No Data	No Data	NF	NF	No Data	No Data	No Data	NF
10	Dusting an Animal	Dog	0.0028	8	10	No Data	No Data	NF	NF	No Data	No Data	No Data	NF
		Dog	0.066	8	10	No Data	No Data	NF	NF	No Data	No Data	No Data	NF
11	Dipping a Dog	Dog	0.0076	8	10	No Data	No Data	NF	NF	No Data	No Data	No Data	NF
12	Use of a Cattle Backrubber	Cattle	0.02	50	2.9	0.023	0.018	NF	NF	1.2	0.24	0.12	NF
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	0.004	100	No Data	2.5	1.6	NF	NF	30	6	3	NF
		Livestock	0.02	100	No Data	2.5	1.6	NF	NF	30	6	3	NF
		Ornamentals	0.0075	40	No Data	2.5	1.6	NF	NF	30	6	3	NF
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	0.0075	40	No Data	2.5	1.6	NF	NF	30	6	3	NF

APPENDIX A/TABLE 2: INPUT PARAMETERS FOR PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		DERMAL UNIT EXPOSURES (mg/lb ai)					INHALATION UNIT EXPOSURES (ug/lb ai)			
			RATE	ACRES OR GALLONS	BASELINE	MIN PPE	MAX PPE	ENGINEERING CONTROL	GLOVE USE	NONE	PF5 RESPIRATOR	PF10 RESPIRATOR	ENG. CONTROL
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	0.004	100	100	0.43	0.37	NF	NF	30	6	3	NF
		Livestock	0.02	100	100	0.43	0.37	NF	NF	30	6	3	NF
		Ornamentals	0.0075	40	100	0.43	0.37	NF	NF	30	6	3	NF
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	0.0075	40	No Data	8.6	6.2	NF	NF	1100	220	110	NF
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	0.009	24	30.8	6	4.6	NF	NF	9.5	1.9	0.95	NF
OCCUPATIONAL FLAGGERS													
16	Flagging For Aerial Spray Applications	Various Nut Trees	5.95	350	0.011	0.012	0.012	0.00022	No	0.35	0.07	0.035	0.007
		Fruit Trees (e.g., pears)	5	350	0.011	0.012	0.012	0.00022	No	0.35	0.07	0.035	0.007
		Fruit & Nuts	3	350	0.011	0.012	0.012	0.00022	No	0.35	0.07	0.035	0.007
		Grapes, Vegetables, etc.	1.5	350	0.011	0.012	0.012	0.00022	No	0.35	0.07	0.035	0.007
		Grapes, Tree Fruit, etc.	1	350	0.011	0.012	0.012	0.00022	No	0.35	0.07	0.035	0.007
		Cotton	0.4	800	0.011	0.012	0.012	0.00022	No	0.35	0.07	0.035	0.007
		Forestry	1	1200	0.011	0.012	0.012	0.00022	No	0.35	0.07	0.035	0.007

APPENDIX A/TABLE 3: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT THE BASELINE PROTECTION LEVEL															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL MIXER/LOADERS															
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	1.16e+01	4.80e-03	1.66e-01	1.66e-02	6.86e-05	90.5	66.4	65625.0	21875.0	16041.7	90.4	90.1	66.1
		Livestock	5.80e+01	2.40e-02	8.29e-01	8.29e-02	3.43e-04	18.1	13.3	13125.0	4375.0	3208.3	18.1	18.0	13.2
		Ornamentals	8.70e+00	3.60e-03	1.24e-01	1.24e-02	5.14e-05	120.7	88.5	87500.0	29166.7	21388.9	120.5	120.2	88.1
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	8.70e+00	3.60e-03	1.24e-01	1.24e-02	5.14e-05	120.7	88.5	87500.0	29166.7	21388.9	120.5	120.2	88.1
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	7.71e+03	8.95e+01	1.10e+02	1.10e+01	1.28e+00	0.1	0.1	3.5	1.2	0.9	0.1	0.1	0.1
		Fruit Trees (e.g., pears)	6.48e+03	7.53e+01	9.25e+01	9.25e+00	1.08e+00	0.2	0.1	4.2	1.4	1.0	0.2	0.1	0.1
		Fruit & Nuts	3.89e+03	4.52e+01	5.55e+01	5.55e+00	6.45e-01	0.3	0.2	7.0	2.3	1.7	0.3	0.2	0.2
		Grapes, Vegetables, etc.	1.94e+03	2.26e+01	2.78e+01	2.78e+00	3.23e-01	0.5	0.4	14.0	4.7	3.4	0.5	0.5	0.4
		Grapes, Tree Fruit, etc.	1.30e+03	1.51e+01	1.85e+01	1.85e+00	2.15e-01	0.8	0.6	20.9	7.0	5.1	0.8	0.7	0.5
		Cotton	1.18e+03	1.38e+01	1.69e+01	1.69e+00	1.97e-01	0.9	0.7	22.9	7.6	5.6	0.9	0.8	0.6
		Forestry	4.44e+03	5.16e+01	6.34e+01	6.34e+00	7.37e-01	0.2	0.2	6.1	2.0	1.5	0.2	0.2	0.2
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	7.40e+01	8.60e-01	1.06e+00	1.06e-01	1.23e-02	14.2	10.4	366.3	122.1	89.5	13.7	12.7	9.3
		Grapes, Vegetables, etc.	4.44e+02	5.16e+00	6.34e+00	6.34e-01	7.37e-02	2.4	1.7	61.0	20.3	14.9	2.3	2.1	1.6
		Grapes, Vegetables, etc.	2.96e+02	3.44e+00	4.23e+00	4.23e-01	4.91e-02	3.5	2.6	91.6	30.5	22.4	3.4	3.2	2.3
		Cotton	1.18e+02	1.38e+00	1.69e+00	1.69e-01	1.97e-02	8.9	6.5	228.9	76.3	56.0	8.5	7.9	5.8

APPENDIX A/TABLE 3: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT THE BASELINE PROTECTION LEVEL															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	8.81e+02	1.02e+01	1.26e+01	1.26e+00	1.46e-01	1.2	0.9	30.8	10.3	7.5	1.1	1.1	0.8
		Fruit Trees (e.g., pears)	7.40e+02	8.60e+00	1.06e+01	1.06e+00	1.23e-01	1.4	1.0	36.6	12.2	9.0	1.4	1.3	0.9
		Fruit & Nuts	4.44e+02	5.16e+00	6.34e+00	6.34e-01	7.37e-02	2.4	1.7	61.0	20.3	14.9	2.3	2.1	1.6
		Grapes, Vegetables, etc.	2.22e+02	2.58e+00	3.17e+00	3.17e-01	3.69e-02	4.7	3.5	122.1	40.7	29.8	4.6	4.2	3.1
		Grapes, Tree Fruit, etc.	1.48e+02	1.72e+00	2.11e+00	2.11e-01	2.46e-02	7.1	5.2	183.1	61.0	44.8	6.8	6.4	4.7
		Ornamentals	1.11e+01	1.29e-01	1.59e-01	1.59e-02	1.84e-03	94.6	69.4	2441.9	814.0	596.9	91.1	84.7	62.1
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	1.11e+01	1.29e-01	1.59e-01	1.59e-02	1.84e-03	94.6	69.4	2441.9	814.0	596.9	91.1	84.7	62.1
2	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	1.30e+02	1.51e+00	1.85e+00	1.85e-01	2.15e-02	8.1	5.9	209.3	69.8	51.2	7.8	7.3	5.3
OCCUPATIONAL APPLICATORS															
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	8.57e+01	1.07e+00	1.22e+00	1.22e-01	1.53e-02	12.3	9.0	294.1	98.0	71.9	11.8	10.9	8.0
		Fruit Trees (e.g., pears)	7.20e+01	9.00e-01	1.03e+00	1.03e-01	1.29e-02	14.6	10.7	350.0	116.7	85.6	14.0	13.0	9.5
		Fruit & Nuts	4.32e+01	5.40e-01	6.17e-01	6.17e-02	7.71e-03	24.3	17.8	583.3	194.4	142.6	23.3	21.6	15.8
		Grapes, Vegetables, etc.	2.16e+01	2.70e-01	3.09e-01	3.09e-02	3.86e-03	48.6	35.6	1166.7	388.9	285.2	46.7	43.2	31.7
		Grapes, Tree Fruit, etc.	1.44e+01	1.80e-01	2.06e-01	2.06e-02	2.57e-03	72.9	53.5	1750.0	583.3	427.8	70.0	64.8	47.5
		Ornamentals	1.08e+00	1.35e-02	1.54e-02	1.54e-03	1.93e-04	972.2	713.0	23333.3	7777.8	5703.7	933.3	864.2	633.7
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2.80e-01	1.48e-02	4.00e-03	4.00e-04	2.11e-04	3750.0	2750.0	21283.8	7094.6	5202.7	3188.3	2453.3	1799.1
		Grapes, Vegetables, etc.	1.68e+00	8.88e-02	2.40e-02	2.40e-03	1.27e-03	625.0	458.3	3547.3	1182.4	867.1	531.4	408.9	299.8
		Grapes, Vegetables, etc.	1.12e+00	5.92e-02	1.60e-02	1.60e-03	8.46e-04	937.5	687.5	5320.9	1773.6	1300.7	797.1	613.3	449.8
		Cotton	4.48e-01	2.37e-02	6.40e-03	6.40e-04	3.38e-04	2343.8	1718.8	13302.4	4434.1	3251.7	1992.7	1533.3	1124.4

APPENDIX A/TABLE 3: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT THE BASELINE PROTECTION LEVEL															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Fruit Trees (e.g., pears)	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Fruit & Nuts	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Grapes, Vegetables, etc.	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Grapes, Tree Fruit, etc.	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Cotton	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Forestry	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
6	Applying With a High Pressure Handwand	Livestock	7.20e+00	3.16e-01	1.03e-01	1.03e-02	4.51e-03	145.8	106.9	996.8	332.3	243.7	127.2	101.4	74.3
		Livestock	3.60e+01	1.58e+00	5.14e-01	5.14e-02	2.26e-02	29.2	21.4	199.4	66.5	48.7	25.4	20.3	14.9
		Ornamentals	5.40e+00	2.37e-01	7.71e-02	7.71e-03	3.39e-03	194.4	142.6	1329.1	443.0	324.9	169.6	135.1	99.1
7	Applying With a Right-of-Way Sprayer	Ornamentals	3.90e+00	1.17e-02	5.57e-02	5.57e-03	1.67e-04	269.2	197.4	26923.1	8974.4	6581.2	266.6	261.4	191.7
8	Dipping Pine Seedlings	Pine Seedlings	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
OCCUPATIONAL MIXER/LOADER/APPLICATORS															
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
10	Dusting an Animal	Dog	2.24e-03	No Data	3.20e-05	3.20e-06	No Data	468750.0	343750.0	No Data	No Data	No Data	468750.0	468750.0	343750.0
		Dog	5.28e-02	No Data	7.54e-04	7.54e-05	No Data	19886.4	14583.3	No Data	No Data	No Data	19886.4	19886.4	14583.3
11	Dipping a Dog	Dog	6.08e-03	No Data	8.69e-05	8.69e-06	No Data	172697.4	126644.7	No Data	No Data	No Data	172697.4	172697.4	126644.7
12	Use of a Cattle Backrubber	Cattle	2.90e+00	1.20e-03	4.14e-02	4.14e-03	1.71e-05	362.1	265.5	262500.0	87500.0	64166.7	361.6	360.6	264.4
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	No Data	1.20e-02	No Data	No Data	1.71e-04	No Data	No Data	26250.0	8750.0	6416.7	26250.0	8750.0	6416.7
		Livestock	No Data	6.00e-02	No Data	No Data	8.57e-04	No Data	No Data	5250.0	1750.0	1283.3	5250.0	1750.0	1283.3
		Ornamentals	No Data	9.00e-03	No Data	No Data	1.29e-04	No Data	No Data	35000.0	11666.7	8555.6	35000.0	11666.7	8555.6
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	No Data	9.00e-03	No Data	No Data	1.29e-04	No Data	No Data	35000.0	11666.7	8555.6	35000.0	11666.7	8555.6
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	4.00e+01	1.20e-02	5.71e-01	5.71e-02	1.71e-04	26.3	19.3	26250.0	8750.0	6416.7	26.2	26.2	19.2
		Livestock	2.00e+02	6.00e-02	2.86e+00	2.86e-01	8.57e-04	5.3	3.9	5250.0	1750.0	1283.3	5.2	5.2	3.8
		Ornamentals	3.00e+01	9.00e-03	4.29e-01	4.29e-02	1.29e-04	35.0	25.7	35000.0	11666.7	8555.6	35.0	34.9	25.6
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	No Data	3.30e-01	No Data	No Data	4.71e-03	No Data	No Data	954.5	318.2	233.3	954.5	318.2	233.3

APPENDIX A/TABLE 3: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT THE BASELINE PROTECTION LEVEL															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	6.65e+00	2.05e-03	9.50e-02	9.50e-03	2.93e-05	157.8	115.7	153508.8	51169.6	37524.4	157.7	157.3	115.4
OCCUPATIONAL FLAGGERS															
16	Flagging For Aerial Spray Applications	Various Nut Trees	2.29e+01	7.29e-01	3.27e-01	3.27e-02	1.04e-02	45.8	33.6	432.2	144.1	105.6	41.4	34.8	25.5
		Fruit Trees (e.g., pears)	1.93e+01	6.13e-01	2.75e-01	2.75e-02	8.75e-03	54.5	40.0	514.3	171.4	125.7	49.3	41.4	30.3
		Fruit & Nuts	1.16e+01	3.68e-01	1.65e-01	1.65e-02	5.25e-03	90.9	66.7	857.1	285.7	209.5	82.2	69.0	50.6
		Grapes, Vegetables, etc.	5.78e+00	1.84e-01	8.25e-02	8.25e-03	2.63e-03	181.8	133.3	1714.3	571.4	419.0	164.4	137.9	101.1
		Grapes, Tree Fruit, etc.	3.85e+00	1.23e-01	5.50e-02	5.50e-03	1.75e-03	272.7	200.0	2571.4	857.1	628.6	246.6	206.9	151.7
		Cotton	3.52e+00	1.12e-01	5.03e-02	5.03e-03	1.60e-03	298.3	218.8	2812.5	937.5	687.5	269.7	226.3	165.9
		Forestry	1.32e+01	4.20e-01	1.89e-01	1.89e-02	6.00e-03	79.5	58.3	750.0	250.0	183.3	71.9	60.3	44.3
Pot. Dermal Dose = potential dose or dose on the surface of the skin (dermal exposure adjusted for body weight) Abs. Dermal Dose = absorbed dose attributable to dermal exposure															

APPENDIX A/TABLE 4: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MINIMUM PPE PROTECTION LEVELS (Gloves & PF 5 Respirators)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL MIXER/LOADERS															
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	9.20e-02	9.60e-04	1.31e-03	1.31e-04	1.37e-05	11413.0	8369.6	328125.0	109375.0	80208.3	11029.4	10334.6	7578.7
		Livestock	4.60e-01	4.80e-03	6.57e-03	6.57e-04	6.86e-05	2282.6	1673.9	65625.0	21875.0	16041.7	2205.9	2066.9	1515.7
		Ornamentals	6.90e-02	7.20e-04	9.86e-04	9.86e-05	1.03e-05	15217.4	11159.4	437500.0	145833.3	106944.4	14705.9	13779.5	10105.0
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	6.90e-02	7.20e-04	9.86e-04	9.86e-05	1.03e-05	15217.4	11159.4	437500.0	145833.3	106944.4	14705.9	13779.5	10105.0
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	3.54e+02	1.79e+01	5.06e+00	5.06e-01	2.56e-01	3.0	2.2	17.6	5.9	4.3	2.5	2.0	1.4
		Fruit Trees (e.g., pears)	2.98e+02	1.51e+01	4.25e+00	4.25e-01	2.15e-01	3.5	2.6	20.9	7.0	5.1	3.0	2.3	1.7
		Fruit & Nuts	1.79e+02	9.03e+00	2.55e+00	2.55e-01	1.29e-01	5.9	4.3	34.9	11.6	8.5	5.0	3.9	2.9
		Grapes, Vegetables, etc.	8.93e+01	4.52e+00	1.28e+00	1.28e-01	6.45e-02	11.8	8.6	69.8	23.3	17.1	10.1	7.8	5.7
		Grapes, Tree Fruit, etc.	5.95e+01	3.01e+00	8.50e-01	8.50e-02	4.30e-02	17.6	12.9	104.7	34.9	25.6	15.1	11.7	8.6
		Cotton	5.44e+01	2.75e+00	7.77e-01	7.77e-02	3.93e-02	19.3	14.2	114.5	38.2	28.0	16.5	12.8	9.4
		Forestry	2.04e+02	1.03e+01	2.91e+00	2.91e-01	1.47e-01	5.1	3.8	30.5	10.2	7.5	4.4	3.4	2.5
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	3.40e+00	1.72e-01	4.86e-02	4.86e-03	2.46e-03	308.8	226.5	1831.4	610.5	447.7	264.3	205.1	150.4
		Grapes, Vegetables, etc.	2.04e+01	1.03e+00	2.91e-01	2.91e-02	1.47e-02	51.5	37.7	305.2	101.7	74.6	44.0	34.2	25.1
		Grapes, Vegetables, etc.	1.36e+01	6.88e-01	1.94e-01	1.94e-02	9.83e-03	77.2	56.6	457.8	152.6	111.9	66.1	51.3	37.6
		Cotton	5.44e+00	2.75e-01	7.77e-02	7.77e-03	3.93e-03	193.0	141.5	1144.6	381.5	279.8	165.2	128.2	94.0
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	4.05e+01	2.05e+00	5.78e-01	5.78e-02	2.92e-02	26.0	19.0	153.9	51.3	37.6	22.2	17.2	12.6
		Fruit Trees (e.g., pears)	3.40e+01	1.72e+00	4.86e-01	4.86e-02	2.46e-02	30.9	22.6	183.1	61.0	44.8	26.4	20.5	15.0
		Fruit & Nuts	2.04e+01	1.03e+00	2.91e-01	2.91e-02	1.47e-02	51.5	37.7	305.2	101.7	74.6	44.0	34.2	25.1
		Grapes, Vegetables, etc.	1.02e+01	5.16e-01	1.46e-01	1.46e-02	7.37e-03	102.9	75.5	610.5	203.5	149.2	88.1	68.4	50.1
		Grapes, Tree Fruit, etc.	6.80e+00	3.44e-01	9.71e-02	9.71e-03	4.91e-03	154.4	113.2	915.7	305.2	223.8	132.1	102.5	75.2
		Ornamentals	5.10e-01	2.58e-02	7.29e-03	7.29e-04	3.69e-04	2058.8	1509.8	12209.3	4069.8	2984.5	1761.7	1367.2	1002.6
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	5.10e-01	2.58e-02	7.29e-03	7.29e-04	3.69e-04	2058.8	1509.8	12209.3	4069.8	2984.5	1761.7	1367.2	1002.6

APPENDIX A/TABLE 4: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MINIMUM PPE PROTECTION LEVELS (Gloves & PF 5 Respirators)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
2	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	5.95e+00	3.01e-01	8.50e-02	8.50e-03	4.30e-03	176.5	129.4	1046.5	348.8	255.8	151.0	117.2	85.9
OCCUPATIONAL APPLICATORS															
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.71e+01	2.14e-01	8.16e-01	8.16e-02	3.06e-03	18.4	13.5	1470.6	490.2	359.5	18.2	17.7	13.0
		Fruit Trees (e.g., pears)	4.80e+01	1.80e-01	6.86e-01	6.86e-02	2.57e-03	21.9	16.0	1750.0	583.3	427.8	21.6	21.1	15.5
		Fruit & Nuts	2.88e+01	1.08e-01	4.11e-01	4.11e-02	1.54e-03	36.5	26.7	2916.7	972.2	713.0	36.0	35.1	25.8
		Grapes, Vegetables, etc.	1.44e+01	5.40e-02	2.06e-01	2.06e-02	7.71e-04	72.9	53.5	5833.3	1944.4	1425.9	72.0	70.3	51.5
		Grapes, Tree Fruit, etc.	9.60e+00	3.60e-02	1.37e-01	1.37e-02	5.14e-04	109.4	80.2	8750.0	2916.7	2138.9	108.0	105.4	77.3
		Ornamentals	7.20e-01	2.70e-03	1.03e-02	1.03e-03	3.86e-05	1458.3	1069.4	116666.7	38888.9	28518.5	1440.3	1405.6	1030.8
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2.80e-01	2.96e-03	4.00e-03	4.00e-04	4.23e-05	3750.0	2750.0	106418.9	35473.0	26013.5	3622.4	3391.5	2487.1
		Grapes, Vegetables, etc.	1.68e+00	1.78e-02	2.40e-02	2.40e-03	2.54e-04	625.0	458.3	17736.5	5912.2	4335.6	603.7	565.2	414.5
		Grapes, Vegetables, etc.	1.12e+00	1.18e-02	1.60e-02	1.60e-03	1.69e-04	937.5	687.5	26604.7	8868.2	6503.4	905.6	847.9	621.8
		Cotton	4.48e-01	4.74e-03	6.40e-03	6.40e-04	6.77e-05	2343.8	1718.8	66511.8	22170.6	16258.4	2264.0	2119.7	1554.4
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Fruit Trees (e.g., pears)	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Fruit & Nuts	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Grapes, Vegetables, etc.	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Grapes, Tree Fruit, etc.	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Cotton	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Forestry	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
6	Applying With a High Pressure Handwand	Livestock	2.56e+00	6.32e-02	3.66e-02	3.66e-03	9.03e-04	410.2	300.8	4984.2	1661.4	1218.4	379.0	328.9	241.2
		Livestock	1.28e+01	3.16e-01	1.83e-01	1.83e-02	4.51e-03	82.0	60.2	996.8	332.3	243.7	75.8	65.8	48.2
		Ornamentals	1.92e+00	4.74e-02	2.74e-02	2.74e-03	6.77e-04	546.9	401.0	6645.6	2215.2	1624.5	505.3	438.6	321.6
7	Applying With a Right-of-Way Sprayer	Ornamentals	1.17e+00	2.34e-03	1.67e-02	1.67e-03	3.34e-05	897.4	658.1	134615.4	44871.8	32906.0	891.5	879.8	645.2
8	Dipping Pine Seedlings	Pine Seedlings	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

APPENDIX A/TABLE 4: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MINIMUM PPE PROTECTION LEVELS (Gloves & PF 5 Respirators)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL MIXER/LOADER/APPLICATORS															
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
10	Dusting an Animal	Dog	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
		Dog	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
11	Dipping a Dog	Dog	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
12	Use of a Cattle Backrubber	Cattle	2.30e-02	2.40e-04	3.29e-04	3.29e-05	3.43e-06	45652.2	33478.3	1312500.0	437500.0	320833.3	44117.6	41338.6	30315.0
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	1.00e+00	2.40e-03	1.43e-02	1.43e-03	3.43e-05	1050.0	770.0	131250.0	43750.0	32083.3	1041.7	1025.4	752.0
		Livestock	5.00e+00	1.20e-02	7.14e-02	7.14e-03	1.71e-04	210.0	154.0	26250.0	8750.0	6416.7	208.3	205.1	150.4
		Ornamentals	7.50e-01	1.80e-03	1.07e-02	1.07e-03	2.57e-05	1400.0	1026.7	175000.0	58333.3	42777.8	1388.9	1367.2	1002.6
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	7.50e-01	1.80e-03	1.07e-02	1.07e-03	2.57e-05	1400.0	1026.7	175000.0	58333.3	42777.8	1388.9	1367.2	1002.6
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	1.72e-01	2.40e-03	2.46e-03	2.46e-04	3.43e-05	6104.7	4476.7	131250.0	43750.0	32083.3	5833.3	5357.1	3928.6
		Livestock	8.60e-01	1.20e-02	1.23e-02	1.23e-03	1.71e-04	1220.9	895.3	26250.0	8750.0	6416.7	1166.7	1071.4	785.7
		Ornamentals	1.29e-01	1.80e-03	1.84e-03	1.84e-04	2.57e-05	8139.5	5969.0	175000.0	58333.3	42777.8	7777.8	7142.9	5238.1
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	2.58e+00	6.60e-02	3.69e-02	3.69e-03	9.43e-04	407.0	298.5	4772.7	1590.9	1166.7	375.0	324.1	237.7
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	1.30e+00	4.10e-04	1.85e-02	1.85e-03	5.86e-06	810.2	594.1	767543.9	255848.0	187621.8	809.3	807.6	592.3

APPENDIX A/TABLE 4: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MINIMUM PPE PROTECTION LEVELS (Gloves & PF 5 Respirators)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL FLAGGERS															
16	Flagging For Aerial Spray Applications	Various Nut Trees	2.50e+01	1.46e-01	3.57e-01	3.57e-02	2.08e-03	42.0	30.8	2160.9	720.3	528.2	41.2	39.7	29.1
		Fruit Trees (e.g., pears)	2.10e+01	1.23e-01	3.00e-01	3.00e-02	1.75e-03	50.0	36.7	2571.4	857.1	628.6	49.0	47.2	34.6
		Fruit & Nuts	1.26e+01	7.35e-02	1.80e-01	1.80e-02	1.05e-03	83.3	61.1	4285.7	1428.6	1047.6	81.7	78.7	57.7
		Grapes, Vegetables, etc.	6.30e+00	3.68e-02	9.00e-02	9.00e-03	5.25e-04	166.7	122.2	8571.4	2857.1	2095.2	163.5	157.5	115.5
		Grapes, Tree Fruit, etc.	4.20e+00	2.45e-02	6.00e-02	6.00e-03	3.50e-04	250.0	183.3	12857.1	4285.7	3142.9	245.2	236.2	173.2
		Cotton	3.84e+00	2.24e-02	5.49e-02	5.49e-03	3.20e-04	273.4	200.5	14062.5	4687.5	3437.5	268.2	258.4	189.5
		Forestry	1.44e+01	8.40e-02	2.06e-01	2.06e-02	1.20e-03	72.9	53.5	3750.0	1250.0	916.7	71.5	68.9	50.5

APPENDIX A/TABLE 5: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MAXIMUM PPE PROTECTION LEVELS (Double Layer Clothing & PF 10 Respirator)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL MIXER/LOADERS															
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	7.20e-02	4.80e-04	1.03e-03	1.03e-04	6.86e-06	14583.3	10694.4	656250.0	218750.0	160416.7	14266.3	13671.9	10026.0
		Livestock	3.60e-01	2.40e-03	5.14e-03	5.14e-04	3.43e-05	2916.7	2138.9	131250.0	43750.0	32083.3	2853.3	2734.4	2005.2
		Ornamentals	5.40e-02	3.60e-04	7.71e-04	7.71e-05	5.14e-06	19444.4	14259.3	875000.0	291666.7	213888.9	19021.7	18229.2	13368.1
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	5.40e-02	3.60e-04	7.71e-04	7.71e-05	5.14e-06	19444.4	14259.3	875000.0	291666.7	213888.9	19021.7	18229.2	13368.1
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	2.71e+02	8.95e+00	3.87e+00	3.87e-01	1.28e-01	3.9	2.8	35.2	11.7	8.6	3.5	2.9	2.1
		Fruit Trees (e.g., pears)	2.28e+02	7.53e+00	3.25e+00	3.25e-01	1.08e-01	4.6	3.4	41.9	14.0	10.2	4.2	3.5	2.5
		Fruit & Nuts	1.37e+02	4.52e+00	1.95e+00	1.95e-01	6.45e-02	7.7	5.6	69.8	23.3	17.1	6.9	5.8	4.2
		Grapes, Vegetables, etc.	6.83e+01	2.26e+00	9.75e-01	9.75e-02	3.23e-02	15.4	11.3	139.5	46.5	34.1	13.9	11.6	8.5
		Grapes, Tree Fruit, etc.	4.55e+01	1.51e+00	6.50e-01	6.50e-02	2.15e-02	23.1	16.9	209.3	69.8	51.2	20.8	17.3	12.7
		Cotton	4.16e+01	1.38e+00	5.94e-01	5.94e-02	1.97e-02	25.2	18.5	228.9	76.3	56.0	22.7	19.0	13.9
		Forestry	1.56e+02	5.16e+00	2.23e+00	2.23e-01	7.37e-02	6.7	4.9	61.0	20.3	14.9	6.1	5.1	3.7
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	2.60e+00	8.60e-02	3.71e-02	3.71e-03	1.23e-03	403.8	296.2	3662.8	1220.9	895.3	363.7	303.5	222.5
		Grapes, Vegetables, etc.	1.56e+01	5.16e-01	2.23e-01	2.23e-02	7.37e-03	67.3	49.4	610.5	203.5	149.2	60.6	50.6	37.1
		Grapes, Vegetables, etc.	1.04e+01	3.44e-01	1.49e-01	1.49e-02	4.91e-03	101.0	74.0	915.7	305.2	223.8	90.9	75.9	55.6
		Cotton	4.16e+00	1.38e-01	5.94e-02	5.94e-03	1.97e-03	252.4	185.1	2289.2	763.1	559.6	227.3	189.7	139.1
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	3.09e+01	1.02e+00	4.42e-01	4.42e-02	1.46e-02	33.9	24.9	307.8	102.6	75.2	30.6	25.5	18.7
		Fruit Trees (e.g., pears)	2.60e+01	8.60e-01	3.71e-01	3.71e-02	1.23e-02	40.4	29.6	366.3	122.1	89.5	36.4	30.3	22.3
		Fruit & Nuts	1.56e+01	5.16e-01	2.23e-01	2.23e-02	7.37e-03	67.3	49.4	610.5	203.5	149.2	60.6	50.6	37.1
		Grapes, Vegetables, etc.	7.80e+00	2.58e-01	1.11e-01	1.11e-02	3.69e-03	134.6	98.7	1220.9	407.0	298.5	121.2	101.2	74.2
		Grapes, Tree Fruit, etc.	5.20e+00	1.72e-01	7.43e-02	7.43e-03	2.46e-03	201.9	148.1	1831.4	610.5	447.7	181.9	151.7	111.3
		Ornamentals	3.90e-01	1.29e-02	5.57e-03	5.57e-04	1.84e-04	2692.3	1974.4	24418.6	8139.5	5969.0	2424.9	2023.1	1483.6
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	3.90e-01	1.29e-02	5.57e-03	5.57e-04	1.84e-04	2692.3	1974.4	24418.6	8139.5	5969.0	2424.9	2023.1	1483.6

APPENDIX A/TABLE 5: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MAXIMUM PPE PROTECTION LEVELS (Double Layer Clothing & PF 10 Respirator)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
2 e	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	4.55e+00	1.51e-01	6.50e-02	6.50e-03	2.15e-03	230.8	169.2	2093.0	697.7	511.6	207.9	173.4	127.2
OCCUPATIONAL APPLICATORS															
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.24e+01	1.07e-01	7.48e-01	7.48e-02	1.53e-03	20.1	14.7	2941.2	980.4	719.0	19.9	19.7	14.4
		Fruit Trees (e.g., pears)	4.40e+01	9.00e-02	6.29e-01	6.29e-02	1.29e-03	23.9	17.5	3500.0	1166.7	855.6	23.7	23.4	17.1
		Fruit & Nuts	2.64e+01	5.40e-02	3.77e-01	3.77e-02	7.71e-04	39.8	29.2	5833.3	1944.4	1425.9	39.5	39.0	28.6
		Grapes, Vegetables, etc.	1.32e+01	2.70e-02	1.89e-01	1.89e-02	3.86e-04	79.5	58.3	11666.7	3888.9	2851.9	79.0	78.0	57.2
		Grapes, Tree Fruit, etc.	8.80e+00	1.80e-02	1.26e-01	1.26e-02	2.57e-04	119.3	87.5	17500.0	5833.3	4277.8	118.5	116.9	85.7
		Ornamentals	6.60e-01	1.35e-03	9.43e-03	9.43e-04	1.93e-05	1590.9	1166.7	233333.3	77777.8	57037.0	1580.1	1559.0	1143.3
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2.20e-01	1.48e-03	3.14e-03	3.14e-04	2.11e-05	4772.7	3500.0	212837.8	70945.9	52027.0	4668.1	4471.9	3279.4
		Grapes, Vegetables, etc.	1.32e+00	8.88e-03	1.89e-02	1.89e-03	1.27e-04	795.5	583.3	35473.0	11824.3	8671.2	778.0	745.3	546.6
		Grapes, Vegetables, etc.	8.80e-01	5.92e-03	1.26e-02	1.26e-03	8.46e-05	1193.2	875.0	53209.5	17736.5	13006.8	1167.0	1118.0	819.8
		Cotton	3.52e-01	2.37e-03	5.03e-03	5.03e-04	3.38e-05	2983.0	2187.5	133023.6	44341.2	32516.9	2917.5	2794.9	2049.6
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Fruit Trees (e.g., pears)	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Fruit & Nuts	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Grapes, Vegetables, etc.	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Grapes, Tree Fruit, etc.	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Cotton	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Forestry	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
6	Applying With a High Pressure Handwand	Livestock	1.44e+00	3.16e-02	2.06e-02	2.06e-03	4.51e-04	729.2	534.7	9968.4	3322.8	2436.7	679.5	598.0	438.5
		Livestock	7.20e+00	1.58e-01	1.03e-01	1.03e-02	2.26e-03	145.8	106.9	1993.7	664.6	487.3	135.9	119.6	87.7
		Ornamentals	1.08e+00	2.37e-02	1.54e-02	1.54e-03	3.39e-04	972.2	713.0	13291.1	4430.4	3248.9	906.0	797.3	584.7
7	Applying With a Right-of-Way Sprayer	Ornamentals	8.70e-01	1.17e-03	1.24e-02	1.24e-03	1.67e-05	1206.9	885.1	269230.8	89743.6	65812.0	1201.5	1190.9	873.3
8	Dipping Pine Seedlings	Pine Seedlings	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

APPENDIX A/TABLE 5: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MAXIMUM PPE PROTECTION LEVELS (Double Layer Clothing & PF 10 Respirator)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL MIXER/LOADER/APPLICATORS															
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
10	Dusting an Animal	Dog	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
		Dog	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
11	Dipping a Dog	Dog	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
12	Use of a Cattle Backrubber	Cattle	1.80e-02	1.20e-04	2.57e-04	2.57e-05	1.71e-06	58333.3	42777.8	2625000.0	875000.0	641666.7	57065.2	54687.5	40104.2
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	6.40e-01	1.20e-03	9.14e-03	9.14e-04	1.71e-05	1640.6	1203.1	262500.0	87500.0	64166.7	1630.4	1610.4	1181.0
		Livestock	3.20e+00	6.00e-03	4.57e-02	4.57e-03	8.57e-05	328.1	240.6	52500.0	17500.0	12833.3	326.1	322.1	236.2
		Ornamentals	4.80e-01	9.00e-04	6.86e-03	6.86e-04	1.29e-05	2187.5	1604.2	350000.0	116666.7	85555.6	2173.9	2147.2	1574.6
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	4.80e-01	9.00e-04	6.86e-03	6.86e-04	1.29e-05	2187.5	1604.2	350000.0	116666.7	85555.6	2173.9	2147.2	1574.6
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	1.48e-01	1.20e-03	2.11e-03	2.11e-04	1.71e-05	7094.6	5202.7	262500.0	87500.0	64166.7	6907.9	6562.5	4812.5
		Livestock	7.40e-01	6.00e-03	1.06e-02	1.06e-03	8.57e-05	1418.9	1040.5	52500.0	17500.0	12833.3	1381.6	1312.5	962.5
		Ornamentals	1.11e-01	9.00e-04	1.59e-03	1.59e-04	1.29e-05	9459.5	6936.9	350000.0	116666.7	85555.6	9210.5	8750.0	6416.7
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	1.86e+00	3.30e-02	2.66e-02	2.66e-03	4.71e-04	564.5	414.0	9545.5	3181.8	2333.3	533.0	479.5	351.6
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	9.94e-01	2.05e-04	1.42e-02	1.42e-03	2.93e-06	1056.8	775.0	1535087.7	511695.9	375243.7	1056.0	1054.6	773.4

APPENDIX A/TABLE 5: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT MAXIMUM PPE PROTECTION LEVELS (Double Layer Clothing & PF 10 Respirator)															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL FLAGGERS															
16	Flagging For Aerial Spray Applications	Various Nut Trees	2.50e+01	7.29e-02	3.57e-01	3.57e-02	1.04e-03	42.0	30.8	4321.7	1440.6	1056.4	41.6	40.8	29.9
		Fruit Trees (e.g., pears)	2.10e+01	6.13e-02	3.00e-01	3.00e-02	8.75e-04	50.0	36.7	5142.9	1714.3	1257.1	49.5	48.6	35.6
		Fruit & Nuts	1.26e+01	3.68e-02	1.80e-01	1.80e-02	5.25e-04	83.3	61.1	8571.4	2857.1	2095.2	82.5	81.0	59.4
		Grapes, Vegetables, etc.	6.30e+00	1.84e-02	9.00e-02	9.00e-03	2.63e-04	166.7	122.2	17142.9	5714.3	4190.5	165.1	161.9	118.8
		Grapes, Tree Fruit, etc.	4.20e+00	1.23e-02	6.00e-02	6.00e-03	1.75e-04	250.0	183.3	25714.3	8571.4	6285.7	247.6	242.9	178.1
		Cotton	3.84e+00	1.12e-02	5.49e-02	5.49e-03	1.60e-04	273.4	200.5	28125.0	9375.0	6875.0	270.8	265.7	194.8
		Forestry	1.44e+01	4.20e-02	2.06e-01	2.06e-02	6.00e-04	72.9	53.5	7500.0	2500.0	1833.3	72.2	70.9	52.0

APPENDIX A/TABLE 6: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT ENGINEERING CONTROL PROTECTION LEVELS															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL MIXER/LOADERS															
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	3.44e-02	3.32e-04	4.91e-04	4.91e-05	4.74e-06	30523.3	22383.7	948795.2	316265.1	231927.71	29571.9	27836.7	20413.6
		Livestock	1.72e-01	1.66e-03	2.46e-03	2.46e-04	2.37e-05	6104.7	4476.7	189759.0	63253.0	46385.5	5914.4	5567.3	4082.7
		Ornamentals	2.58e-02	2.49e-04	3.69e-04	3.69e-05	3.56e-06	40697.7	29845.0	1265060.2	421686.7	309236.9	39429.2	37115.6	27218.1
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	2.58e-02	2.49e-04	3.69e-04	3.69e-05	3.56e-06	40697.7	29845.0	1265060.2	421686.7	309236.9	39429.2	37115.6	27218.1
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	4.37e+01	5.00e-01	6.25e-01	6.25e-02	7.14e-03	24.0	17.6	630.3	210.1	154.1	23.1	21.5	15.8
		Fruit Trees (e.g., pears)	3.68e+01	4.20e-01	5.25e-01	5.25e-02	6.00e-03	28.6	21.0	750.0	250.0	183.3	27.5	25.6	18.8
		Fruit & Nuts	2.21e+01	2.52e-01	3.15e-01	3.15e-02	3.60e-03	47.6	34.9	1250.0	416.7	305.6	45.9	42.7	31.3
		Grapes, Vegetables, etc.	1.10e+01	1.26e-01	1.58e-01	1.58e-02	1.80e-03	95.2	69.8	2500.0	833.3	611.1	91.7	85.5	62.7
		Grapes, Tree Fruit, etc.	7.35e+00	8.40e-02	1.05e-01	1.05e-02	1.20e-03	142.9	104.8	3750.0	1250.0	916.7	137.6	128.2	94.0
		Cotton	6.72e+00	7.68e-02	9.60e-02	9.60e-03	1.10e-03	156.3	114.6	4101.6	1367.2	1002.6	150.5	140.2	102.8
		Forestry	2.52e+01	2.88e-01	3.60e-01	3.60e-02	4.11e-03	41.7	30.6	1093.8	364.6	267.4	40.1	37.4	27.4
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	4.20e-01	4.80e-03	6.00e-03	6.00e-04	6.86e-05	2500.0	1833.3	65625.0	21875.0	16041.7	2408.3	2243.6	1645.3
		Grapes, Vegetables, etc.	2.52e+00	2.88e-02	3.60e-02	3.60e-03	4.11e-04	416.7	305.6	10937.5	3645.8	2673.6	401.4	373.9	274.2
		Grapes, Vegetables, etc.	1.68e+00	1.92e-02	2.40e-02	2.40e-03	2.74e-04	625.0	458.3	16406.3	5468.8	4010.4	602.1	560.9	411.3
		Cotton	6.72e-01	7.68e-03	9.60e-03	9.60e-04	1.10e-04	1562.5	1145.8	41015.6	13671.9	10026.0	1505.2	1402.2	1028.3

APPENDIX A/TABLE 6: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT ENGINEERING CONTROL PROTECTION LEVELS															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT. -TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	5.00e+00	5.71e-02	7.14e-02	7.14e-03	8.16e-04	210.1	154.1	5514.7	1838.2	1348.0	202.4	188.5	138.3
		Fruit Trees (e.g., pears)	4.20e+00	4.80e-02	6.00e-02	6.00e-03	6.86e-04	250.0	183.3	6562.5	2187.5	1604.2	240.8	224.4	164.5
		Fruit & Nuts	2.52e+00	2.88e-02	3.60e-02	3.60e-03	4.11e-04	416.7	305.6	10937.5	3645.8	2673.6	401.4	373.9	274.2
		Grapes, Vegetables, etc.	1.26e+00	1.44e-02	1.80e-02	1.80e-03	2.06e-04	833.3	611.1	21875.0	7291.7	5347.2	802.8	747.9	548.4
		Grapes, Tree Fruit, etc.	8.40e-01	9.60e-03	1.20e-02	1.20e-03	1.37e-04	1250.0	916.7	32812.5	10937.5	8020.8	1204.1	1121.8	822.7
		Ornamentals	6.30e-02	7.20e-04	9.00e-04	9.00e-05	1.03e-05	16666.7	12222.2	437500.0	145833.3	106944.4	16055.0	14957.3	10968.7
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	6.30e-02	7.20e-04	9.00e-04	9.00e-05	1.03e-05	16666.7	12222.2	437500.0	145833.3	106944.4	16055.0	14957.3	10968.7
2 e	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	7.35e-01	8.40e-03	1.05e-02	1.05e-03	1.20e-04	1428.6	1047.6	37500.0	12500.0	9166.7	1376.1	1282.1	940.2
OCCUPATIONAL APPLICATORS															
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	4.52e+00	1.07e-01	6.46e-02	6.46e-03	1.53e-03	232.2	170.3	2941.2	980.4	719.0	215.2	187.7	137.7
		Fruit Trees (e.g., pears)	3.80e+00	9.00e-02	5.43e-02	5.43e-03	1.29e-03	276.3	202.6	3500.0	1166.7	855.6	256.1	223.4	163.8
		Fruit & Nuts	2.28e+00	5.40e-02	3.26e-02	3.26e-03	7.71e-04	460.5	337.7	5833.3	1944.4	1425.9	426.8	372.3	273.1
		Grapes, Vegetables, etc.	1.14e+00	2.70e-02	1.63e-02	1.63e-03	3.86e-04	921.1	675.4	11666.7	3888.9	2851.9	853.7	744.7	546.1
		Grapes, Tree Fruit, etc.	7.60e-01	1.80e-02	1.09e-02	1.09e-03	2.57e-04	1381.6	1013.2	17500.0	5833.3	4277.8	1280.5	1117.0	819.1
		Ornamentals	5.70e-02	1.35e-03	8.14e-04	8.14e-05	1.93e-05	18421.1	13508.8	233333.3	77777.8	57037.0	17073.2	14893.6	10922.0
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	1.00e-01	8.60e-04	1.43e-03	1.43e-04	1.23e-05	10500.0	7700.0	366279.1	122093.0	89534.9	10207.4	9668.5	7090.2
		Grapes, Vegetables, etc.	6.00e-01	5.16e-03	8.57e-03	8.57e-04	7.37e-05	1750.0	1283.3	61046.5	20348.8	14922.5	1701.2	1611.4	1181.7
		Grapes, Vegetables, etc.	4.00e-01	3.44e-03	5.71e-03	5.71e-04	4.91e-05	2625.0	1925.0	91569.8	30523.3	22383.7	2551.8	2417.1	1772.6
		Cotton	1.60e-01	1.38e-03	2.29e-03	2.29e-04	1.97e-05	6562.5	4812.5	228924.4	76308.1	55959.3	6379.6	6042.8	4431.4

APPENDIX A/TABLE 6: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT ENGINEERING CONTROL PROTECTION LEVELS															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	1.04e+01	1.42e-01	1.49e-01	1.49e-02	2.02e-03	100.8	74.0	2224.4	741.5	543.7	96.5	88.8	65.1
		Fruit Trees (e.g., pears)	8.75e+00	1.19e-01	1.25e-01	1.25e-02	1.70e-03	120.0	88.0	2647.1	882.4	647.1	114.8	105.6	77.5
		Fruit & Nuts	5.25e+00	7.14e-02	7.50e-02	7.50e-03	1.02e-03	200.0	146.7	4411.8	1470.6	1078.4	191.3	176.1	129.1
		Grapes, Vegetables, etc.	2.63e+00	3.57e-02	3.75e-02	3.75e-03	5.10e-04	400.0	293.3	8823.5	2941.2	2156.9	382.7	352.1	258.2
		Grapes, Tree Fruit, etc.	1.75e+00	2.38e-02	2.50e-02	2.50e-03	3.40e-04	600.0	440.0	13235.3	4411.8	3235.3	574.0	528.2	387.3
		Cotton	1.60e+00	2.18e-02	2.29e-02	2.29e-03	3.11e-04	656.3	481.3	14476.1	4825.4	3538.6	627.8	577.7	423.6
		Forestry	6.00e+00	8.16e-02	8.57e-02	8.57e-03	1.17e-03	175.0	128.3	3860.3	1286.8	943.6	167.4	154.0	113.0
6	Applying With a High Pressure Handwand	Livestock	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Livestock	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Ornamentals	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
7	Applying With a Right-of-Way Sprayer	Ornamentals	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
8	Dipping Pine Seedlings	Pine Seedlings	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
OCCUPATIONAL MIXER/LOADER/APPLICATORS															
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
10	Dusting an Animal	Dog	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Dog	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
11	Dipping a Dog	Dog	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
12	Use of a Cattle Backrubber	Cattle	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Livestock	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Ornamentals	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Livestock	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
		Ornamentals	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF

APPENDIX A/TABLE 6: PHOSMET OCCUPATIONAL HANDLER EXPOSURE AND RISK CALCULATIONS AT ENGINEERING CONTROL PROTECTION LEVELS															
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE			DERMAL MOEs		INHALATION MOEs			COMBINED MOEs		
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL ≤30 Days (mg/kg/day)	ABS. DERMAL >30 Days (mg/kg/day)	INHALAT. (mg/kg/day)	SH. & INT.-TERM ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days	SHORT-TERM ≤7 Days	INT.-TERM >7 & ≤30 Days	INT.-TERM >30 Days
OCCUPATIONAL FLAGGERS															
16	Flagging For Aerial Spray Applications	Various Nut Trees	4.58e-01	1.46e-02	6.55e-03	6.55e-04	2.08e-04	2291.8	1680.7	21608.6	7202.9	5282.1	2072.1	1738.6	1275.0
		Fruit Trees (e.g., pears)	3.85e-01	1.23e-02	5.50e-03	5.50e-04	1.75e-04	2727.3	2000.0	25714.3	8571.4	6285.7	2465.8	2069.0	1517.2
		Fruit & Nuts	2.31e-01	7.35e-03	3.30e-03	3.30e-04	1.05e-04	4545.5	3333.3	42857.1	14285.7	10476.2	4109.6	3448.3	2528.7
		Grapes, Vegetables, etc.	1.16e-01	3.68e-03	1.65e-03	1.65e-04	5.25e-05	9090.9	6666.7	85714.3	28571.4	20952.4	8219.2	6896.6	5057.5
		Grapes, Tree Fruit, etc.	7.70e-02	2.45e-03	1.10e-03	1.10e-04	3.50e-05	13636.4	10000.0	128571.4	42857.1	31428.6	12328.8	10344.8	7586.2
		Cotton	7.04e-02	2.24e-03	1.01e-03	1.01e-04	3.20e-05	14914.8	10937.5	140625.0	46875.0	34375.0	13484.6	11314.7	8297.4
		Forestry	2.64e-01	8.40e-03	3.77e-03	3.77e-04	1.20e-04	3977.3	2916.7	37500.0	12500.0	9166.7	3595.9	3017.2	2212.6

APPENDIX A/TABLE 7: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL DERMAL EXPOSURE												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT- & INTERMEDIATE-TERM (≤30 DAYS) DERMAL MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 DAYS) DERMAL MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS
OCCUPATIONAL MIXER/LOADERS												
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	0.004	1000	90.5	11413.0	14583.3	30523.3	66.4	8369.6	10694.4	22383.7
		Livestock	0.02	1000	18.1	2282.6	2916.7	6104.7	13.3	1673.9	2138.9	4476.7
		Ornamentals	0.0075	400	120.7	15217.4	19444.4	40697.7	88.5	11159.4	14259.3	29845.0
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	0.06	50	120.7	15217.4	19444.4	40697.7	88.5	11159.4	14259.3	29845.0
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	5.95	350	0.1	3.0	3.9	24.0	0.1	2.2	2.8	17.6
		Fruit Trees (e.g., pears)	5	350	0.2	3.5	4.6	28.6	0.1	2.6	3.4	21.0
		Fruit & Nuts	3	350	0.3	5.9	7.7	47.6	0.2	4.3	5.6	34.9
		Grapes, Vegetables, etc.	1.5	350	0.5	11.8	15.4	95.2	0.4	8.6	11.3	69.8
		Grapes, Tree Fruit, etc.	1	350	0.8	17.6	23.1	142.9	0.6	12.9	16.9	104.8
		Cotton	0.4	800	0.9	19.3	25.2	156.3	0.7	14.2	18.5	114.6
		Forestry	1	1200	0.2	5.1	6.7	41.7	0.2	3.8	4.9	30.6
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	2	10	14.2	308.8	403.8	2500.0	10.4	226.5	296.2	1833.3
		Grapes, Vegetables, etc.	1.5	80	2.4	51.5	67.3	416.7	1.7	37.7	49.4	305.6
		Grapes, Vegetables, etc.	1	80	3.5	77.2	101.0	625.0	2.6	56.6	74.0	458.3
		Cotton	0.4	80	8.9	193.0	252.4	1562.5	6.5	141.5	185.1	1145.8

APPENDIX A/TABLE 7: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL DERMAL EXPOSURE												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT- & INTERMEDIATE-TERM (≤30 DAYS) DERMAL MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 DAYS) DERMAL MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	5.95	40	1.2	26.0	33.9	210.1	0.9	19.0	24.9	154.1
		Fruit Trees (e.g., pears)	5	40	1.4	30.9	40.4	250.0	1.0	22.6	29.6	183.3
		Fruit & Nuts	3	40	2.4	51.5	67.3	416.7	1.7	37.7	49.4	305.6
		Grapes, Vegetables, etc.	1.5	40	4.7	102.9	134.6	833.3	3.5	75.5	98.7	611.1
		Grapes, Tree Fruit, etc.	1	40	7.1	154.4	201.9	1250.0	5.2	113.2	148.1	916.7
		Ornamentals	0.06	50	94.6	2058.8	2692.3	16666.7	69.4	1509.8	1974.4	12222.2
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	0.0075	400	94.6	2058.8	2692.3	16666.7	69.4	1509.8	1974.4	12222.2
2 e	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	0.35	100	8.1	176.5	230.8	1428.6	5.9	129.4	169.2	1047.6
OCCUPATIONAL APPLICATORS												
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.95	40	12.3	18.4	20.1	232.2	9.0	13.5	14.7	170.3
		Fruit Trees (e.g., pears)	5	40	14.6	21.9	23.9	276.3	10.7	16.0	17.5	202.6
		Fruit & Nuts	3	40	24.3	36.5	39.8	460.5	17.8	26.7	29.2	337.7
		Grapes, Vegetables, etc.	1.5	40	48.6	72.9	79.5	921.1	35.6	53.5	58.3	675.4
		Grapes, Tree Fruit, etc.	1	40	72.9	109.4	119.3	1381.6	53.5	80.2	87.5	1013.2
		Ornamentals	0.06	50	972.2	1458.3	1590.9	18421.1	713.0	1069.4	1166.7	13508.8
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2	10	3750.0	3750.0	4772.7	10500.0	2750.0	2750.0	3500.0	7700.0
		Grapes, Vegetables, etc.	1.5	80	625.0	625.0	795.5	1750.0	458.3	458.3	583.3	1283.3
		Grapes, Vegetables, etc.	1	80	937.5	937.5	1193.2	2625.0	687.5	687.5	875.0	1925.0
		Cotton	0.4	80	2343.8	2343.8	2983.0	6562.5	1718.8	1718.8	2187.5	4812.5

APPENDIX A/TABLE 7: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL DERMAL EXPOSURE												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT- & INTERMEDIATE-TERM (≤30 DAYS) DERMAL MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 DAYS) DERMAL MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	5.95	350	NF	NF	NF	100.8	NF	NF	NF	74.0
		Fruit Trees (e.g., pears)	5	350	NF	NF	NF	120.0	NF	NF	NF	88.0
		Fruit & Nuts	3	350	NF	NF	NF	200.0	NF	NF	NF	146.7
		Grapes, Vegetables, etc.	1.5	350	NF	NF	NF	400.0	NF	NF	NF	293.3
		Grapes, Tree Fruit, etc.	1	350	NF	NF	NF	600.0	NF	NF	NF	440.0
		Cotton	0.4	800	NF	NF	NF	656.3	NF	NF	NF	481.3
		Forestry	1	1200	NF	NF	NF	175.0	NF	NF	NF	128.3
6	Applying With a High Pressure Handwand	Livestock	0.004	1000	145.8	410.2	729.2	NF	106.9	300.8	534.7	NF
		Livestock	0.02	1000	29.2	82.0	145.8	NF	21.4	60.2	106.9	NF
		Ornamentals	0.0075	400	194.4	546.9	972.2	NF	142.6	401.0	713.0	NF
7	Applying With a Right-of-Way Sprayer	Ornamentals	0.0075	400	269.2	897.4	1206.9	NF	197.4	658.1	885.1	NF
8	Dipping Pine Seedlings	Pine Seedlings	0.35	100	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF
OCCUPATIONAL MIXER/LOADER/APPLICATORS												
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	0.013	No Data	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF
10	Dusting an Animal	Dog	0.0028	8	468750.0	No Data	No Data	NF	343750.0	No Data	No Data	NF
		Dog	0.066	8	19886.4	No Data	No Data	NF	14583.3	No Data	No Data	NF
11	Dipping a Dog	Dog	0.0076	8	172697.4	No Data	No Data	NF	126644.7	No Data	No Data	NF
12	Use of a Cattle Backrubber	Cattle	0.02	50	362.1	45652.2	58333.3	NF	265.5	33478.3	42777.8	NF
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	0.004	100	No Data	1050.0	1640.6	NF	No Data	770.0	1203.1	NF
		Livestock	0.02	100	No Data	210.0	328.1	NF	No Data	154.0	240.6	NF
		Ornamentals	0.0075	40	No Data	1400.0	2187.5	NF	No Data	1026.7	1604.2	NF
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	0.0075	40	No Data	1400.0	2187.5	NF	No Data	1026.7	1604.2	NF
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	0.004	100	26.3	6104.7	7094.6	NF	19.3	4476.7	5202.7	NF
		Livestock	0.02	100	5.3	1220.9	1418.9	NF	3.9	895.3	1040.5	NF
		Ornamentals	0.0075	40	35.0	8139.5	9459.5	NF	25.7	5969.0	6936.9	NF
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	0.0075	40	No Data	407.0	564.5	NF	No Data	298.5	414.0	NF

APPENDIX A/TABLE 7: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL DERMAL EXPOSURE												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT- & INTERMEDIATE-TERM (≤30 DAYS) DERMAL MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 DAYS) DERMAL MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS	BASELINE	MINIMUM PPE (SINGLE LAYER & GLOVES)	MAXIMUM PPE (DOUBLE LAYER & GLOVES)	ENG. CONTROLS
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	0.009	24	157.8	810.2	1056.8	NF	115.7	594.1	775.0	NF
OCCUPATIONAL FLAGGERS												
16	Flagging For Aerial Spray Applications	Various Nut Trees	5.95	350	45.8	42.0	42.0	2291.8	33.6	30.8	30.8	1680.7
		Fruit Trees (e.g., pears)	5	350	54.5	50.0	50.0	2727.3	40.0	36.7	36.7	2000.0
		Fruit & Nuts	3	350	90.9	83.3	83.3	4545.5	66.7	61.1	61.1	3333.3
		Grapes, Vegetables, etc.	1.5	350	181.8	166.7	166.7	9090.9	133.3	122.2	122.2	6666.7
		Grapes, Tree Fruit, etc.	1	350	272.7	250.0	250.0	13636.4	200.0	183.3	183.3	10000.0
		Cotton	0.4	800	298.3	273.4	273.4	14914.8	218.8	200.5	200.5	10937.5
		Forestry	1	1200	79.5	72.9	72.9	3977.3	58.3	53.5	53.5	2916.7

APPENDIX A/TABLE 8: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL INHALATION EXPOSURE																
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT-TERM INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>7 & ≤30 Days) INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 Days) INHALATION MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT.	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT
OCCUPATIONAL MIXER/LOADERS																
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	0	1000	65625.0	328125.0	656250.0	948795.2	21875.0	109375.0	218750.0	316265.1	16041.7	80208.3	160416.7	231927.7
		Livestock	0.02	1000	13125.0	65625.0	131250.0	189759.0	4375.0	21875.0	43750.0	63253.0	3208.3	16041.7	32083.3	46385.5
		Ornamentals	0.01	400	87500.0	437500.0	875000.0	1265060.2	29166.7	145833.3	291666.7	421686.7	21388.9	106944.4	213888.9	309236.9
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	0.06	50	87500.0	437500.0	875000.0	1265060.2	29166.7	145833.3	291666.7	421686.7	21388.9	106944.4	213888.9	309236.9
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	5.95	350	3.5	17.6	35.2	630.3	1.2	5.9	11.7	210.1	0.9	4.3	8.6	154.1
		Fruit Trees (e.g., pears)	5	350	4.2	20.9	41.9	750.0	1.4	7.0	14.0	250.0	1.0	5.1	10.2	183.3
		Fruit & Nuts	3	350	7.0	34.9	69.8	1250.0	2.3	11.6	23.3	416.7	1.7	8.5	17.1	305.6
		Grapes, Vegetables, etc.	1.5	350	14.0	69.8	139.5	2500.0	4.7	23.3	46.5	833.3	3.4	17.1	34.1	611.1
		Grapes, Tree Fruit, etc.	1	350	20.9	104.7	209.3	3750.0	7.0	34.9	69.8	1250.0	5.1	25.6	51.2	916.7
		Cotton	0.4	800	22.9	114.5	228.9	4101.6	7.6	38.2	76.3	1367.2	5.6	28.0	56.0	1002.6
		Forestry	1	1200	6.1	30.5	61.0	1093.8	2.0	10.2	20.3	364.6	1.5	7.5	14.9	267.4
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	2	10	366.3	1831.4	3662.8	65625.0	122.1	610.5	1220.9	21875.0	89.5	447.7	895.3	16041.7
		Grapes, Vegetables, etc.	1.5	80	61.0	305.2	610.5	10937.5	20.3	101.7	203.5	3645.8	14.9	74.6	149.2	2673.6
		Grapes, Vegetables, etc.	1	80	91.6	457.8	915.7	16406.3	30.5	152.6	305.2	5468.8	22.4	111.9	223.8	4010.4
		Cotton	0.4	80	228.9	1144.6	2289.2	41015.6	76.3	381.5	763.1	13671.9	56.0	279.8	559.6	10026.0

APPENDIX A/TABLE 8: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL INHALATION EXPOSURE																
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT-TERM INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>7 & ≤30 Days) INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 Days) INHALATION MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT.	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	5.95	40	30.8	153.9	307.8	5514.7	10.3	51.3	102.6	1838.2	7.5	37.6	75.2	1348.0
		Fruit Trees (e.g., pears)	5	40	36.6	183.1	366.3	6562.5	12.2	61.0	122.1	2187.5	9.0	44.8	89.5	1604.2
		Fruit & Nuts	3	40	61.0	305.2	610.5	10937.5	20.3	101.7	203.5	3645.8	14.9	74.6	149.2	2673.6
		Grapes, Vegetables, etc.	1.5	40	122.1	610.5	1220.9	21875.0	40.7	203.5	407.0	7291.7	29.8	149.2	298.5	5347.2
		Grapes, Tree Fruit, etc.	1	40	183.1	915.7	1831.4	32812.5	61.0	305.2	610.5	10937.5	44.8	223.8	447.7	8020.8
		Ornamentals	0.06	50	2441.9	12209.3	24418.6	437500.0	814.0	4069.8	8139.5	145833.3	596.9	2984.5	5969.0	106944.4
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	0.01	400	2441.9	12209.3	24418.6	437500.0	814.0	4069.8	8139.5	145833.3	596.9	2984.5	5969.0	106944.4
2 e	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	0.35	100	209.3	1046.5	2093.0	37500.0	69.8	348.8	697.7	12500.0	51.2	255.8	511.6	9166.7
OCCUPATIONAL APPLICATORS																
3 e	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.95	40	294.1	1470.6	2941.2	2941.2	98.0	490.2	980.4	980.4	71.9	359.5	719.0	719.0
		Fruit Trees (e.g., pears)	5	40	350.0	1750.0	3500.0	3500.0	116.7	583.3	1166.7	1166.7	85.6	427.8	855.6	855.6
		Fruit & Nuts	3	40	583.3	2916.7	5833.3	5833.3	194.4	972.2	1944.4	1944.4	142.6	713.0	1425.9	1425.9
		Grapes, Vegetables, etc.	1.5	40	1166.7	5833.3	11666.7	11666.7	388.9	1944.4	3888.9	3888.9	285.2	1425.9	2851.9	2851.9
		Grapes, Tree Fruit, etc.	1	40	1750.0	8750.0	17500.0	17500.0	583.3	2916.7	5833.3	5833.3	427.8	2138.9	4277.8	4277.8
		Ornamentals	0.06	50	23333.3	116666.7	233333.3	233333.3	7777.8	38888.9	77777.8	77777.8	5703.7	28518.5	57037.0	57037.0

APPENDIX A/TABLE 8: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL INHALATION EXPOSURE																
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT-TERM INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>7 & ≤30 Days) INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 Days) INHALATION MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT.	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2	10	21283.8	106418.9	212837.8	366279.1	7094.6	35473.0	70945.9	122093.0	5202.7	26013.5	52027.0	89534.9
		Grapes, Vegetables, etc.	1.5	80	3547.3	17736.5	35473.0	61046.5	1182.4	5912.2	11824.3	20348.8	867.1	4335.6	8671.2	14922.5
		Grapes, Vegetables, etc.	1	80	5320.9	26604.7	53209.5	91569.8	1773.6	8868.2	17736.5	30523.3	1300.7	6503.4	13006.8	22383.7
		Cotton	0.4	80	13302.4	66511.8	133023.6	228924.4	4434.1	22170.6	44341.2	76308.1	3251.7	16258.4	32516.9	55959.3
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	5.95	350	NF	NF	NF	2224.4	NF	NF	NF	741.5	NF	NF	NF	543.7
		Fruit Trees (e.g., pears)	5	350	NF	NF	NF	2647.1	NF	NF	NF	882.4	NF	NF	NF	647.1
		Fruit & Nuts	3	350	NF	NF	NF	4411.8	NF	NF	NF	1470.6	NF	NF	NF	1078.4
		Grapes, Vegetables, etc.	1.5	350	NF	NF	NF	8823.5	NF	NF	NF	2941.2	NF	NF	NF	2156.9
		Grapes, Tree Fruit, etc.	1	350	NF	NF	NF	13235.3	NF	NF	NF	4411.8	NF	NF	NF	3235.3
		Cotton	0.4	800	NF	NF	NF	14476.1	NF	NF	NF	4825.4	NF	NF	NF	3538.6
		Forestry	1	1200	NF	NF	NF	3860.3	NF	NF	NF	1286.8	NF	NF	NF	943.6
6	Applying With a High Pressure Handwand	Livestock	0	1000	996.8	4984.2	9968.4	NF	332.3	1661.4	3322.8	NF	243.7	1218.4	2436.7	NF
		Livestock	0.02	1000	199.4	996.8	1993.7	NF	66.5	332.3	664.6	NF	48.7	243.7	487.3	NF
		Ornamentals	0.01	400	1329.1	6645.6	13291.1	NF	443.0	2215.2	4430.4	NF	324.9	1624.5	3248.9	NF
7	Applying With a Right-of-Way Sprayer	Ornamentals	0.01	400	26923.1	134615.4	269230.8	NF	8974.4	44871.8	89743.6	NF	6581.2	32906.0	65812.0	NF
8	Dipping Pine Seedlings	Pine Seedlings	0.35	100	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF
OCCUPATIONAL MIXER/LOADER/APPLICATORS																
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	0	No Data	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF

APPENDIX A/TABLE 8: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL INHALATION EXPOSURE																
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT-TERM INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>7 & ≤30 Days) INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 Days) INHALATION MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT.	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT
10	Dusting an Animal	Dog	0	8	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF
		Dog	0.066	8	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF
11	Dipping a Dog	Dog	0.01	8	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF	No Data	No Data	No Data	NF
12	Use of a Cattle Backrubber	Cattle	0.02	50	262500.0	1312500.0	2625000.0	NF	87500.0	437500.0	875000.0	NF	64166.7	320833.3	641666.7	NF
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	0	100	26250.0	131250.0	262500.0	NF	8750.0	43750.0	87500.0	NF	6416.7	32083.3	64166.7	NF
		Livestock	0.02	100	5250.0	26250.0	52500.0	NF	1750.0	8750.0	17500.0	NF	1283.3	6416.7	12833.3	NF
		Ornamentals	0.01	40	35000.0	175000.0	350000.0	NF	11666.7	58333.3	116666.7	NF	8555.6	42777.8	85555.6	NF
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	0.01	40	35000.0	175000.0	350000.0	NF	11666.7	58333.3	116666.7	NF	8555.6	42777.8	85555.6	NF
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	0	100	26250.0	131250.0	262500.0	NF	8750.0	43750.0	87500.0	NF	6416.7	32083.3	64166.7	NF
		Livestock	0.02	100	5250.0	26250.0	52500.0	NF	1750.0	8750.0	17500.0	NF	1283.3	6416.7	12833.3	NF
		Ornamentals	0.01	40	35000.0	175000.0	350000.0	NF	11666.7	58333.3	116666.7	NF	8555.6	42777.8	85555.6	NF
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	0.01	40	954.5	4772.7	9545.5	NF	318.2	1590.9	3181.8	NF	233.3	1166.7	2333.3	NF
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	0.01	24	153508.8	767543.9	1535087.7	NF	51169.6	255848.0	511695.9	NF	37524.4	187621.8	375243.7	NF

APPENDIX A/TABLE 8: PHOSMET MOEs ATTRIBUTABLE TO OCCUPATIONAL INHALATION EXPOSURE																
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SHORT-TERM INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>7 & ≤30 Days) INHALATION MOEs FOR VARIED PROTECTION				INTERMEDIATE-TERM (>30 Days) INHALATION MOEs FOR VARIED PROTECTION			
			RATE	ACRES OR GALLONS	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT.	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT	BASELINE	MINI PPE (PF 5 RESP)	MAX PPE (PF 10 RESP)	ENG. CONT
OCCUPATIONAL FLAGGERS																
16	Flagging For Aerial Spray Applications	Various Nut Trees	5.95	350	432.2	2160.9	4321.7	21608.6	144.1	720.3	1440.6	7202.9	105.6	528.2	1056.4	5282.1
		Fruit Trees (e.g., pears)	5	350	514.3	2571.4	5142.9	25714.3	171.4	857.1	1714.3	8571.4	125.7	628.6	1257.1	6285.7
		Fruit & Nuts	3	350	857.1	4285.7	8571.4	42857.1	285.7	1428.6	2857.1	14285.7	209.5	1047.6	2095.2	10476.2
		Grapes, Vegetables, etc.	1.5	350	1714.3	8571.4	17142.9	85714.3	571.4	2857.1	5714.3	28571.4	419.0	2095.2	4190.5	20952.4
		Grapes, Tree Fruit, etc.	1	350	2571.4	12857.1	25714.3	128571.4	857.1	4285.7	8571.4	42857.1	628.6	3142.9	6285.7	31428.6
		Cotton	0.4	800	2812.5	14062.5	28125.0	140625.0	937.5	4687.5	9375.0	46875.0	687.5	3437.5	6875.0	34375.0
		Forestry	1	1200	750.0	3750.0	7500.0	37500.0	250.0	1250.0	2500.0	12500.0	183.3	916.7	1833.3	9166.7

APPENDIX A/TABLE 9: PHOSMET MOEs ATTRIBUTABLE TO COMBINED SHORT-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (≤7 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLE 2)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 3)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	ENG. CONTROLS (TABLE 4)
OCCUPATIONAL MIXER/LOADERS												
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	0.004	1000	90.4	9722.2	11029.4	11217.9	11931.8	13962.8	14266.3	29571.9
		Livestock	0.02	1000	18.1	1944.4	2205.9	2243.6	2386.4	2792.6	2853.3	5914.4
		Ornamentals	0.008	400	120.5	12963.0	14705.9	14957.3	15909.1	18617.0	19021.7	39429.2
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	0.06	50	120.5	12963.0	14705.9	14957.3	15909.1	18617.0	19021.7	39429.2
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	5.95	350	0.1	1.6	2.5	2.7	1.8	3.2	3.5	23.1
		Fruit Trees (e.g., pears)	5	350	0.2	1.9	3.0	3.3	2.2	3.8	4.2	27.5
		Fruit & Nuts	3	350	0.3	3.2	5.0	5.4	3.7	6.3	6.9	45.9
		Grapes, Vegetables, etc.	1.5	350	0.5	6.4	10.1	10.9	7.3	12.6	13.9	91.7
		Grapes, Tree Fruit, etc.	1	350	0.8	9.6	15.1	16.3	11.0	18.9	20.8	137.6
		Cotton	0.4	800	0.9	10.5	16.5	17.8	12.0	20.7	22.7	150.5
		Forestry	1	1200	0.2	2.8	4.4	4.7	3.2	5.5	6.1	40.1
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	2	10	13.7	167.6	264.3	284.8	192.1	330.9	363.7	2408.3
		Grapes, Vegetables, etc.	1.5	80	2.3	27.9	44.0	47.5	32.0	55.1	60.6	401.4
		Grapes, Vegetables, etc.	1	80	3.4	41.9	66.1	71.2	48.0	82.7	90.9	602.1
		Cotton	0.4	80	8.5	104.7	165.2	178.0	120.0	206.8	227.3	1505.2

APPENDIX A/TABLE 9: PHOSMET MOEs ATTRIBUTABLE TO COMBINED SHORT-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (≤7 DAYS DURATION)												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLE 2)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 3)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	ENG. CONTROLS (TABLE 4)
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	5.95	40	1.1	14.1	22.2	23.9	16.1	27.8	30.6	202.4
		Fruit Trees (e.g., pears)	5	40	1.4	16.8	26.4	28.5	19.2	33.1	36.4	240.8
		Fruit & Nuts	3	40	2.3	27.9	44.0	47.5	32.0	55.1	60.6	401.4
		Grapes, Vegetables, etc.	1.5	40	4.6	55.9	88.1	94.9	64.0	110.3	121.2	802.8
		Grapes, Tree Fruit, etc.	1	40	6.8	83.8	132.1	142.4	96.0	165.4	181.9	1204.1
		Ornamentals	0.06	50	91.1	1117.0	1761.7	1898.7	1280.5	2205.9	2424.9	16055.0
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	0.008	400	91.1	1117.0	1761.7	1898.7	1280.5	2205.9	2424.9	16055.0
2 e	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	0.35	100	7.8	95.7	151.0	162.7	109.8	189.1	207.9	1376.1
OCCUPATIONAL APPLICATORS												
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.95	40	11.8	17.3	18.2	18.3	18.8	19.8	19.9	215.2
		Fruit Trees (e.g., pears)	5	40	14.0	20.6	21.6	21.7	22.3	23.5	23.7	256.1
		Fruit & Nuts	3	40	23.3	34.3	36.0	36.2	37.2	39.2	39.5	426.8
		Grapes, Vegetables, etc.	1.5	40	46.7	68.6	72.0	72.5	74.5	78.5	79.0	853.7
		Grapes, Tree Fruit, etc.	1	40	70.0	102.9	108.0	108.7	111.7	117.7	118.5	1280.5
		Ornamentals	0.06	50	933.3	1372.5	1440.3	1449.3	1489.4	1569.5	1580.1	17073.2

APPENDIX A/TABLE 9: PHOSMET MOEs ATTRIBUTABLE TO COMBINED SHORT-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (≤7 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLE 2)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 3)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	ENG. CONTROLS (TABLE 4)
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2	10	3188.3	3188.3	3622.4	3685.1	3898.5	4567.9	4668.1	10207.4
		Grapes, Vegetables, etc.	1.5	80	531.4	531.4	603.7	614.2	649.8	761.3	778.0	1701.2
		Grapes, Vegetables, etc.	1	80	797.1	797.1	905.6	921.3	974.6	1142.0	1167.0	2551.8
		Cotton	0.4	80	1992.7	1992.7	2264.0	2303.2	2436.6	2854.9	2917.5	6379.6
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	5.95	350	NF	NF	NF	NF	NF	NF	NF	96.5
		Fruit Trees (e.g., pears)	5	350	NF	NF	NF	NF	NF	NF	NF	114.8
		Fruit & Nuts	3	350	NF	NF	NF	NF	NF	NF	NF	191.3
		Grapes, Vegetables, etc.	1.5	350	NF	NF	NF	NF	NF	NF	NF	382.7
		Grapes, Tree Fruit, etc.	1	350	NF	NF	NF	NF	NF	NF	NF	574.0
		Cotton	0.4	800	NF	NF	NF	NF	NF	NF	NF	627.8
		Forestry	1	1200	NF	NF	NF	NF	NF	NF	NF	167.4
6	Applying With a High Pressure Handwand	Livestock	0.004	1000	127.2	290.6	379.0	393.9	421.1	636.1	679.5	NF
		Livestock	0.02	1000	25.4	58.1	75.8	78.8	84.2	127.2	135.9	NF
		Ornamentals	0.008	400	169.6	387.5	505.3	525.3	561.5	848.1	906.0	NF
7	Applying With a Right-of-Way Sprayer	Ornamentals	0.008	400	266.6	868.5	891.5	894.5	1155.1	1196.2	1201.5	NF
8	Dipping Pine Seedlings	Pine Seedlings	0.35	100	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
OCCUPATIONAL MIXER/LOADER/APPLICATORS												
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	0.013	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
10	Dusting an Animal	Dog	0.003	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
		Dog	0.066	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
11	Dipping a Dog	Dog	0.008	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	N
12	Use of a Cattle Backrubber	Cattle	0.02	50	361.6	38888.9	44117.6	44871.8	47727.3	55851.1	57065.2	NF

APPENDIX A/TABLE 9: PHOSMET MOEs ATTRIBUTABLE TO COMBINED SHORT-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (≤7 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLE 2)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 3)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	ENG. CONTROLS (TABLE 4)
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	0.004	100	No Data	1009.6	1041.7	1045.8	1544.1	1620.4	1630.4	NF
		Livestock	0.02	100	No Data	201.9	208.3	209.2	308.8	324.1	326.1	NF
		Ornamentals	0.008	40	No Data	1346.2	1388.9	1394.4	2058.8	2160.5	2173.9	NF
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	0.008	40	No Data	1346.2	1388.9	1394.4	2058.8	2160.5	2173.9	NF
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	0.004	100	26.2	4952.8	5833.3	5965.9	5585.1	6730.8	6907.9	NF
		Livestock	0.02	100	5.2	990.6	1166.7	1193.2	1117.0	1346.2	1381.6	NF
		Ornamentals	0.008	40	35.0	6603.8	7777.8	7954.5	7446.8	8974.4	9210.5	NF
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	0.008	40	No Data	285.3	375.0	390.3	354.7	504.8	533.0	NF
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	0.009	24	157.7	805.9	809.3	809.8	1049.5	1055.3	1056.0	NF
OCCUPATIONAL FLAGGERS												
16	Flagging For Aerial Spray Applications	Various Nut Trees	5.95	350	41.4	38.3	41.2	41.6	38.3	41.2	41.6	2072.1
		Fruit Trees (e.g., pears)	5	350	49.3	45.6	49.0	49.5	45.6	49.0	49.5	2465.8
		Fruit & Nuts	3	350	82.2	75.9	81.7	82.5	75.9	81.7	82.5	4109.6
		Grapes, Vegetables, etc.	1.5	350	164.4	151.9	163.5	165.1	151.9	163.5	165.1	8219.2
		Grapes, Tree Fruit, etc.	1	350	246.6	227.8	245.2	247.6	227.8	245.2	247.6	12328.8
		Cotton	0.4	800	269.7	249.2	268.2	270.8	249.2	268.2	270.8	13484.6
		Forestry	1	1200	71.9	66.5	71.5	72.2	66.5	71.5	72.2	3595.9

APPENDIX A/TABLE 10: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>7 & ≤30 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
OCCUPATIONAL MIXER/LOADERS												
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	0.004	1000	90.1	7500.0	10334.6	10847.1	8750.0	12867.6	13671.9	27836.7
		Livestock	0.02	1000	18.0	1500.0	2066.9	2169.4	1750.0	2573.5	2734.4	5567.3
		Ornamentals	0.008	400	120.2	10000.0	13779.5	14462.8	11666.7	17156.9	18229.2	37115.6
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	0.06	50	120.2	10000.0	13779.5	14462.8	11666.7	17156.9	18229.2	37115.6
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	5.95	350	0.1	0.8	2.0	2.4	0.9	2.3	2.9	21.5
		Fruit Trees (e.g., pears)	5	350	0.1	1.0	2.3	2.8	1.1	2.8	3.5	25.6
		Fruit & Nuts	3	350	0.2	1.7	3.9	4.7	1.8	4.6	5.8	42.7
		Grapes, Vegetables, etc.	1.5	350	0.5	3.3	7.8	9.4	3.6	9.3	11.6	85.5
		Grapes, Tree Fruit, etc.	1	350	0.7	5.0	11.7	14.1	5.4	13.9	17.3	128.2
		Cotton	0.4	800	0.8	5.5	12.8	15.4	5.9	15.2	19.0	140.2
		Forestry	1	1200	0.2	1.5	3.4	4.1	1.6	4.1	5.1	37.4
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	2	10	12.7	87.5	205.1	246.5	93.8	243.1	303.5	2243.6
		Grapes, Vegetables, etc.	1.5	80	2.1	14.6	34.2	41.1	15.6	40.5	50.6	373.9
		Grapes, Vegetables, etc.	1	80	3.2	21.9	51.3	61.6	23.4	60.8	75.9	560.9
		Cotton	0.4	80	7.9	54.7	128.2	154.0	58.6	151.9	189.7	1402.2

APPENDIX A/TABLE 10: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>7 & ≤30 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	5.95	40	1.1	7.4	17.2	20.7	7.9	20.4	25.5	188.5
		Fruit Trees (e.g., pears)	5	40	1.3	8.8	20.5	24.6	9.4	24.3	30.3	224.4
		Fruit & Nuts	3	40	2.1	14.6	34.2	41.1	15.6	40.5	50.6	373.9
		Grapes, Vegetables, etc.	1.5	40	4.2	29.2	68.4	82.2	31.3	81.0	101.2	747.9
		Grapes, Tree Fruit, etc.	1	40	6.4	43.8	102.5	123.2	46.9	121.5	151.7	1121.8
		Ornamentals	0.06	50	84.7	583.3	1367.2	1643.2	625.0	1620.4	2023.1	14957.3
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	0.008	400	84.7	583.3	1367.2	1643.2	625.0	1620.4	2023.1	14957.3
2 e	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	0.35	100	7.3	50.0	117.2	140.8	53.6	138.9	173.4	1282.1
OCCUPATIONAL APPLICATORS												
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.95	40	10.9	15.5	17.7	18.0	16.6	19.3	19.7	187.7
		Fruit Trees (e.g., pears)	5	40	13.0	18.4	21.1	21.5	19.8	22.9	23.4	223.4
		Fruit & Nuts	3	40	21.6	30.7	35.1	35.8	33.0	38.2	39.0	372.3
		Grapes, Vegetables, etc.	1.5	40	43.2	61.4	70.3	71.6	66.0	76.4	78.0	744.7
		Grapes, Tree Fruit, etc.	1	40	64.8	92.1	105.4	107.4	99.1	114.6	116.9	1117.0
		Ornamentals	0.06	50	864.2	1228.1	1405.6	1431.5	1320.8	1528.4	1559.0	14893.6

APPENDIX A/TABLE 10: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>7 & ≤30 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2	10	2453.3	2453.3	3391.5	3561.7	2853.3	4206.7	4471.9	9668.5
		Grapes, Vegetables, etc.	1.5	80	408.9	408.9	565.2	593.6	475.5	701.1	745.3	1611.4
		Grapes, Vegetables, etc.	1	80	613.3	613.3	847.9	890.4	713.3	1051.7	1118.0	2417.1
		Cotton	0.4	80	1533.3	1533.3	2119.7	2226.1	1783.3	2629.2	2794.9	6042.8
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	5.95	350	NF	NF	NF	NF	NF	NF	NF	88.8
		Fruit Trees (e.g., pears)	5	350	NF	NF	NF	NF	NF	NF	NF	105.6
		Fruit & Nuts	3	350	NF	NF	NF	NF	NF	NF	NF	176.1
		Grapes, Vegetables, etc.	1.5	350	NF	NF	NF	NF	NF	NF	NF	352.1
		Grapes, Tree Fruit, etc.	1	350	NF	NF	NF	NF	NF	NF	NF	528.2
		Cotton	0.4	800	NF	NF	NF	NF	NF	NF	NF	577.7
		Forestry	1	1200	NF	NF	NF	NF	NF	NF	NF	154.0
6	Applying With a High Pressure Handwand	Livestock	0.004	1000	101.4	183.6	328.9	365.1	228.3	506.8	598.0	NF
		Livestock	0.02	1000	20.3	36.7	65.8	73.0	45.7	101.4	119.6	NF
		Ornamentals	0.008	400	135.1	244.8	438.6	486.8	304.3	675.7	797.3	NF
7	Applying With a Right-of-Way Sprayer	Ornamentals	0.008	400	261.4	815.9	879.8	888.6	1063.8	1175.3	1190.9	NF
8	Dipping Pine Seedlings	Pine Seedlings	0.35	100	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
OCCUPATIONAL MIXER/LOADER/APPLICATORS												
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	0.0125	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
10	Dusting an Animal	Dog	0.003	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
		Dog	0.066	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
11	Dipping a Dog	Dog	0.008	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
12	Use of a Cattle Backrubber	Cattle	0.02	50	360.6	30000.0	41338.6	43388.4	35000.0	51470.6	54687.5	NF

APPENDIX A/TABLE 10: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>7 & ≤30 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	0.004	100	No Data	937.5	1025.4	1037.5	1381.6	1581.3	1610.4	NF
		Livestock	0.02	100	No Data	187.5	205.1	207.5	276.3	316.3	322.1	NF
		Ornamentals	0.008	40	No Data	1250.0	1367.2	1383.4	1842.1	2108.4	2147.2	NF
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	0.008	40	No Data	1250.0	1367.2	1383.4	1842.1	2108.4	2147.2	NF
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	0.004	100	26.2	3595.9	5357.1	5706.5	3917.9	6104.7	6562.5	NF
		Livestock	0.02	100	5.2	719.2	1071.4	1141.3	783.6	1220.9	1312.5	NF
		Ornamentals	0.008	40	34.9	4794.5	7142.9	7608.7	5223.9	8139.5	8750.0	NF
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	0.008	40	No Data	178.6	324.1	360.8	203.5	416.7	479.5	NF
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	0.009	24	157.3	797.6	807.6	808.9	1035.4	1052.4	1054.6	NF
OCCUPATIONAL FLAGGERS												
16	Flagging For Aerial Spray Applications	Various Nut Trees	5.95	350	34.8	32.5	39.7	40.8	32.5	39.7	40.8	1738.6
		Fruit Trees (e.g., pears)	5	350	41.4	38.7	47.2	48.6	38.7	47.2	48.6	2069.0
		Fruit & Nuts	3	350	69.0	64.5	78.7	81.0	64.5	78.7	81.0	3448.3
		Grapes, Vegetables, etc.	1.5	350	137.9	129.0	157.5	161.9	129.0	157.5	161.9	6896.6
		Grapes, Tree Fruit, etc.	1	350	206.9	193.5	236.2	242.9	193.5	236.2	242.9	10344.8
		Cotton	0.4	800	226.3	211.7	258.4	265.7	211.7	258.4	265.7	11314.7
		Forestry	1	1200	60.3	56.5	68.9	70.9	56.5	68.9	70.9	3017.2

APPENDIX A/TABLE 11: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>30 DAYS DURATION)													
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
OCCUPATIONAL MIXER/LOADERS												
1a	Mixing/loading Liquids to For High Pressure Handwand Applications (Also includes right-of-way sprayers for ornamentals)	Livestock	0.004	1000	66.1	5500.0	7578.7	7954.5	6416.7	9436.3	10026.0	20413.6
		Livestock	0.02	1000	13.2	1100.0	1515.7	1590.9	1283.3	1887.3	2005.2	4082.7
		Ornamentals	0.008	400	88.1	7333.3	10105.0	10606.1	8555.6	12581.7	13368.1	27218.1
1b	Mixing/loading Liquids for Airblast Application	Ornamentals	0.06	50	88.1	7333.3	10105.0	10606.1	8555.6	12581.7	13368.1	27218.1
2a	Mixing/loading Wettable Powders For Aerial Application & Chemigation	Various Nut Trees	5.95	350	0.1	0.6	1.4	1.7	0.7	1.7	2.1	15.8
		Fruit Trees (e.g., pears)	5	350	0.1	0.7	1.7	2.1	0.8	2.0	2.5	18.8
		Fruit & Nuts	3	350	0.2	1.2	2.9	3.4	1.3	3.4	4.2	31.3
		Grapes, Vegetables, etc.	1.5	350	0.4	2.4	5.7	6.9	2.6	6.8	8.5	62.7
		Grapes, Tree Fruit, etc.	1	350	0.5	3.7	8.6	10.3	3.9	10.2	12.7	94.0
		Cotton	0.4	800	0.6	4.0	9.4	11.3	4.3	11.1	13.9	102.8
		Forestry	1	1200	0.2	1.1	2.5	3.0	1.1	3.0	3.7	27.4
2b	Mixing/loading Wettable Powders For Groundboom Application	Noncrop/field perimeters	2	10	9.3	64.2	150.4	180.8	68.8	178.2	222.5	1645.3
		Grapes, Vegetables, etc.	1.5	80	1.6	10.7	25.1	30.1	11.5	29.7	37.1	274.2
		Grapes, Vegetables, etc.	1	80	2.3	16.0	37.6	45.2	17.2	44.6	55.6	411.3
		Cotton	0.4	80	5.8	40.1	94.0	113.0	43.0	111.4	139.1	1028.3

APPENDIX A/TABLE 11: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>30 DAYS DURATION)												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
2c	Mixing/loading Wettable Powders For Airblast Application	Various Nut Trees	5.95	40	0.8	5.4	12.6	15.2	5.8	15.0	18.7	138.3
		Fruit Trees (e.g., pears)	5	40	0.9	6.4	15.0	18.1	6.9	17.8	22.3	164.5
		Fruit & Nuts	3	40	1.6	10.7	25.1	30.1	11.5	29.7	37.1	274.2
		Grapes, Vegetables, etc.	1.5	40	3.1	21.4	50.1	60.3	22.9	59.4	74.2	548.4
		Grapes, Tree Fruit, etc.	1	40	4.7	32.1	75.2	90.4	34.4	89.1	111.3	822.7
		Ornamentals	0.06	50	62.1	427.8	1002.6	1205.0	458.3	1188.3	1483.6	10968.7
2d	Mixing/loading Wettable Powders For High Pressure Handwand Application	Ornamentals	0.008	400	62.1	427.8	1002.6	1205.0	458.3	1188.3	1483.6	10968.7
2 e	Mixing/loading Wettable Powders For Treating Pine Seedlings	Pine Seedlings	0.35	100	5.3	36.7	85.9	103.3	39.3	101.9	127.2	940.2
OCCUPATIONAL APPLICATORS												
3	Applying Sprays With an Airblast Sprayer	Various Nut Trees	5.95	40	8.0	11.4	13.0	13.2	12.2	14.1	14.4	137.7
		Fruit Trees (e.g., pears)	5	40	9.5	13.5	15.5	15.7	14.5	16.8	17.1	163.8
		Fruit & Nuts	3	40	15.8	22.5	25.8	26.2	24.2	28.0	28.6	273.1
		Grapes, Vegetables, etc.	1.5	40	31.7	45.0	51.5	52.5	48.4	56.0	57.2	546.1
		Grapes, Tree Fruit, etc.	1	40	47.5	67.5	77.3	78.7	72.6	84.1	85.7	819.1
		Ornamentals	0.06	50	633.7	900.6	1030.8	1049.8	968.6	1120.8	1143.3	10922.0

APPENDIX A/TABLE 11: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>30 DAYS DURATION)												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
4	Applying Sprays With a Groundboom Sprayer	Noncrop/field perimeters	2	10	1799.1	1799.1	2487.1	2611.9	2092.4	3084.9	3279.4	7090.2
		Grapes, Vegetables, etc.	1.5	80	299.8	299.8	414.5	435.3	348.7	514.2	546.6	1181.7
		Grapes, Vegetables, etc.	1	80	449.8	449.8	621.8	653.0	523.1	771.2	819.8	1772.6
		Cotton	0.4	80	1124.4	1124.4	1554.4	1632.5	1307.7	1928.1	2049.6	4431.4
5	Aerial Application of Sprays With a Fixed Wing Aircraft (Fixed-wing aircraft also accounts for helicopter pilot exposures)	Various Nut Trees	5.95	350	NF	NF	NF	NF	NF	NF	NF	65.1
		Fruit Trees (e.g., pears)	5	350	NF	NF	NF	NF	NF	NF	NF	77.5
		Fruit & Nuts	3	350	NF	NF	NF	NF	NF	NF	NF	129.1
		Grapes, Vegetables, etc.	1.5	350	NF	NF	NF	NF	NF	NF	NF	258.2
		Grapes, Tree Fruit, etc.	1	350	NF	NF	NF	NF	NF	NF	NF	387.3
		Cotton	0.4	800	NF	NF	NF	NF	NF	NF	NF	423.6
		Forestry	1	1200	NF	NF	NF	NF	NF	NF	NF	113.0
6	Applying With a High Pressure Handwand	Livestock	0.004	1000	74.3	134.6	241.2	267.7	167.4	371.6	438.5	NF
		Livestock	0.02	1000	14.9	26.9	48.2	53.5	33.5	74.3	87.7	NF
		Ornamentals	0.008	400	99.1	179.5	321.6	357.0	223.2	495.5	584.7	NF
7	Applying With a Right-of-Way Sprayer	Ornamentals	0.008	400	191.7	598.3	645.2	651.6	780.1	861.9	873.3	NF
8	Dipping Pine Seedlings	Pine Seedlings	0.35	100	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
OCCUPATIONAL MIXER/LOADER/APPLICATORS												
9	Mixing/loading/applying With a Power Duster	Sweet Potatoes	0.0125	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
10	Dusting an Animal	Dog	0.003	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
		Dog	0.066	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
11	Dipping a Dog	Dog	0.008	8	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NF
12	Use of a Cattle Backrubber	Cattle	0.02	50	264.4	22000.0	30315.0	31818.2	25666.7	37745.1	40104.2	NF

APPENDIX A/TABLE 11: PHOSMET MOEs ATTRIBUTABLE TO COMBINED INTERMEDIATE-TERM OCCUPATIONAL DERMAL AND INHALATION EXPOSURES (>30 DAYS DURATION)												
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS		SUMMARY MOEs FOR COMBINATIONS OF DERMAL AND INHALATION PROTECTIVE MEASURES							
			RATE	ACRES OR GALLONS	BASELINE (TABLE 2)	SINGLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 &3)	SINGLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLE 3)	SINGLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & NO RESPIRATOR (TABLES 2 & 4)	DOUBLE LAYER, GLOVES & PF 5 RESPIRATOR (TABLES 3 & 4)	DOUBLE LAYER, GLOVES & PF 10 RESPIRATOR (TABLE 4)	ENG. CONTROLS (TABLE 5)
13a	Mixing/loading/applying Liquids With a Backpack Sprayer	Livestock	0.004	100	No Data	687.5	752.0	760.9	1013.2	1159.6	1181.0	NF
		Livestock	0.02	100	No Data	137.5	150.4	152.2	202.6	231.9	236.2	NF
		Ornamentals	0.008	40	No Data	916.7	1002.6	1014.5	1350.9	1546.2	1574.6	NF
13b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	0.008	40	No Data	916.7	1002.6	1014.5	1350.9	1546.2	1574.6	NF
14a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Livestock	0.004	100	19.2	2637.0	3928.6	4184.8	2873.1	4476.7	4812.5	NF
		Livestock	0.02	100	3.8	527.4	785.7	837.0	574.6	895.3	962.5	NF
		Ornamentals	0.008	40	25.6	3516.0	5238.1	5579.7	3830.8	5969.0	6416.7	NF
14b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	0.008	40	No Data	131.0	237.7	264.6	149.2	305.6	351.6	NF
15	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	0.009	24	115.4	584.9	592.3	593.2	759.3	771.8	773.4	NF
OCCUPATIONAL FLAGGERS												
16	Flagging For Aerial Spray Applications	Various Nut Trees	5.95	350	25.5	23.9	29.1	29.9	23.9	29.1	29.9	1275.0
		Fruit Trees (e.g., pears)	5	350	30.3	28.4	34.6	35.6	28.4	34.6	35.6	1517.2
		Fruit & Nuts	3	350	50.6	47.3	57.7	59.4	47.3	57.7	59.4	2528.7
		Grapes, Vegetables, etc.	1.5	350	101.1	94.6	115.5	118.8	94.6	115.5	118.8	5057.5
		Grapes, Tree Fruit, etc.	1	350	151.7	141.9	173.2	178.1	141.9	173.2	178.1	7586.2
		Cotton	0.4	800	165.9	155.2	189.5	194.8	155.2	189.5	194.8	8297.4
		Forestry	1	1200	44.3	41.4	50.5	52.0	41.4	50.5	52.0	2212.6

APPENDIX B: RESIDENTIAL (HOMEOWNER) HANDLER RISK ASSESSMENT FOR PHOSMET

Table 1: Residential Handler Scenario Descriptions for the Use of Phosmet

Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments[a]
Mixer/Loader/Applicator Descriptors			
Dusting an Animal (1)	SOPs for Residential Exposure Assessments (7/97)	minimum dog weight (5 lbs) and maximum dog weight (120 lbs), 1 dog is dusted	The SOPs For Residential Exposure Assessment served as the basis for this assessment (i.e., the assumptions that were used to predict exposures from pet use products in which a percentage of the application rate is the predictor of potential dermal dose). The scenario is based on the use of a residential clothing scenario (i.e., short pants, short-sleeved shirt, no gloves, no respirator). Note that the same value is used as for the occupational handler scenarios. The refinement of the SOPs for Residential Exposure Assessment is such that furhter delineation based on clothing scenario is not appropriate (i.e., to alter value based on use of short vs. long pants and long-sleeved vs. short-sleeved shirts).
Dipping a Dog (2)	SOPs for Residential Exposure Assessments (7/97)	one gallon of dip and 1 dog is dipped	The SOPs For Residential Exposure Assessment served as the basis for this assessment (i.e., the assumptions that were used to predict exposures from pet use products in which a percentage of the application rate is the predictor of potential dermal dose). The scenario is based on the use of a residential clothing scenario (i.e., short pants, short-sleeved shirt, no gloves, no respirator). Note that the same value is used as for the occupational handler scenarios. The refinement of the SOPs for Residential Exposure Assessment is such that furhter delineation based on clothing scenario is not appropriate (i.e., to alter value based on use of short vs. long pants and long-sleeved vs. short-sleeved shirts).
Mixing/Loading/Applying with a Backpack Sprayer (3a\3b)	PHED V1.1 (7/97 Residential SOP Surrogate Table)	5 gallons	Inhalation and dermal = acceptable grades. Hand data = C grade. Dermal = 9 to 11 replicates, hand = 11 replicates, and inhalation = 11 replicates. Medium confidence in dermal and inhalation data. Low confidence in hand data. **Hand exposure values were back-calculated using empirical data that were generated using chemical-resistant gloves and a 90 percent protection factor. An additional 10x safety factor was applied to the hand exposure value because the calculated hand exposure value did not correspond to the level expected given the other dermal exposure values for the scenario (the 10x factor addition was completed based on instructions contained in the Residential SOPs).** Application of risk mitigation measures is inappropriate for residential handler exposure scenarios. The exposure values represent a residential handler clothing scenario.
Mixing/Loading/Applying Liquids with a Low Pressure Sprayer (4a)	PHED V1.1 (7/97 Residential SOP Surrogate Table)	5 gallons	Hands = all grades; dermal and inhalation = ABC grades. Dermal = 9 to 80 replicates; hand = 70 replicates; and inhalation = 80 replicates. Low confidence in dermal and hand data. Medium confidence in inhalation data. Application of risk mitigation measures is inappropriate for residential handler exposure scenarios. The exposure values represent a residential handler clothing scenario.
Mixing/Loading/Applying Wettable Powders with a Low Pressure Sprayer (4b)	PHED V1.1 (7/97 Residential SOP Surrogate Table)	5 gallons	Dermal, inhalation, and hand data are = ABC grade. Dermal = 16 replicates; hand = 16 replicates, and inhalation = 16 replicates. Medium confidence in dermal and inhalation data. Extremely low confidence in hand data, in fact it should be considered for rangefinder purposes only because empirical hand monitoring data were only available with chemical-resistant gloves. These data were used to back calculate a bare-handed exposure value using the 90 % protection factor that is commonly applied to account for the use of gloves. Application of risk mitigation measures is inappropriate for residential handler exposure scenarios. The exposure values represent a residential handler clothing scenario.
Mixing/Loading/Applying Liquids and Wettable Powders with a Garden Hose-End Sprayer (5a/5b)	PHED V1.1 (7/97 Residential SOP Surrogate Table)	5 gallons	Dermal and inhalation = C grade. Hand = E grade. Dermal = 8 replicates; hands = 8 replicates; and inhalation = 8 replicates. Low confidence in all data. An extrapolation has been completed for this scenario as the empirical data are based on the use of liquid formulations and these data have been used to also evaluate the mixer/loader/applicator hose-end sprayer use of wettable powder formulations. Application of risk mitigation measures is inappropriate for residential handler exposure scenarios. The exposure values represent a residential handler clothing scenario.

Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments[a]
Mixing/Loading/Applying Soluble Concentrates For Sprinkling (6)	PHED V1.1 (7/97 Residential SOP Surrogate Table)	10 ft^2 of fire ant mound which translates to 5 mounds of 2ft^2 each	**The same data were used to complete the assessment for fireant control that were used to complete the hose-end sprayer application assessment.** It is believed that there is enough similarity between the exposures that one would receive from both application methods that the extrapolation is warranted. It should, howver, be considered as a rangefinder estimate of exposure for risk characterization and mitigation purposes. Dermal and inhalation = C grade. Hand = E grade. Dermal = 8 replicates; hands = 8 replicates; and inhalation = 8 replicates. Low confidence in all data. An extrapolation has been completed for this scenario as the empirical data are based on the use of liquid formulations and these data have been used to also evaluate the mixer/loader/applicator hose-end sprayer use of wettable powder formulations. Application of risk mitigation measures is inappropriate for residential handler exposure scenarios. The exposure values represent a residential handler clothing scenario.

a All *Standard Assumptions* are based on an 8-hour work day as estimated by HED. BEAD data were not available.

b All handler exposure assessments in this document are based on the "Best Available" data as defined by the PHED SOP for meeting Subdivision U Guidelines (i.e., completing exposure assessments). Best available grades are assigned to data as follows: matrices with A and B grade data (i.e., Acceptable Grade Data) and a minimum of 15 replicates; if not available, then grades A, B and C data and a minimum of 15 replicates; if not available, then all data regardless of the quality (i.e., All Grade Data) and number of replicates. High quality data with a protection factor take precedence over low quality data with no protection factor. Generic data confidence categories are assigned as follows:

High	= grades A and B and 15 or more replicates per body part
Medium	= grades A, B, and C and 15 or more replicates per body part
Low	= grades A, B, C, D and E or any combination of grades with less than 15 replicates.

c **PHED grading criteria do not reflect overall quality of the reliability of the assessment. Sources of the exposure factors should also be considered in the risk management decision.**

APPENDIX B/TABLE 2: INPUT PARAMETERS FOR PHOSMET HOMEOWNER HANDLER EXPOSURE AND RISK CALCULATIONS

SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	EXPOSURE FACTORS				DERMAL UNIT EXPOSURES (mg/lb ai)	INHALATION UNIT EXPOSURES (ug/lb ai) NONE
			RATE	UNITS	AMOUNT TREATED	ANIMALS, ACRES OR GALLONS/A		
1	Dusting an Animal	Dog	0.0028	lb ai/dog	1	dog	10	No Data
		Dog	0.066	lb ai/dog	1	dog	10	No Data
2	Dipping a Dog	Dog	0.0076	lb ai/gallon of dip	1	gallon of dip solution	10	No Data
3a	Mixing/loading/applying Liquids With a Backpack Sprayer	Ornamentals	0.0075	lb ai/gallon spray	5	gallons applied	5.1	30
3b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	0.01	lb ai/gallon spray	5	gallons applied	5.1	30
		Peas	0.00012	lb ai/ft2 of peas	150	ft2 treated	5.1	30
		Potatoes	0.00012	lb ai/ft2 of potatoes	150	ft2 treated	5.1	30
		Fruit Trees	0.0098	lb ai/gallon spray	10	gallons applied	5.1	30
4a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Ornamentals	0.0075	lb ai/gallon spray	5	gallons applied	100	30
4b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	0.01	lb ai/gallon spray	5	gallons applied	250	1100
		Peas	0.00012	lb ai/ft2 of peas	150	ft2 treated	250	1100
		Potatoes	0.00012	lb ai/ft2 of potatoes	150	ft2 treated	250	1100
		Fruit Trees	0.0098	lb ai/gallon spray	10	gallons applied	250	1100
5a	Mixing/loading/applying Liquids With a Garden Hose-End Sprayer	Ornamentals	0.0075	lb ai/gallon spray	5	gallons applied	30	9.5
5b	Mixing/loading/applying Wettable Powders With a Garden Hose-End Sprayer	Ornamentals	0.01	lb ai/gallon spray	5	gallons applied	30	9.5
		Peas	0.00012	lb ai/ft2 of peas	150	ft2 treated	30	9.5
		Potatoes	0.00012	lb ai/ft2 of potatoes	150	ft2 treated	30	9.5
		Fruit Trees	0.0098	lb ai/gallon spray	10	gallons applied	30	9.5
6	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	0.009	lb ai per ft2 of ant mound	10	ft2 (5-2ft2mounds) treated	30	9.5

APPENDIX B/TABLE 3: PHOSMET MOEs ATTRIBUTABLE TO COMBINED SHORT-TERM HOMEOWNER HANDLER DERMAL AND INHALATION EXPOSURES									
SCEN.	SCEN. DESCRIPTOR	CROP TYPE OR TARGET	DAILY EXPOSURE		DAILY DOSE		DERMAL MOEs	INHALATION MOEs	COMBINED MOEs
			DERMAL (mg/day)	INHALAT. (mg/day)	POT. DERMAL (mg/kg/day)	INHALAT. (mg/kg/day)			
1	Dusting an Animal	Dog	2.80e-04	No Data	4.00e-06	No Data	3750000.0	No Data	No Data
		Dog	6.60e-03	No Data	9.43e-05	No Data	159090.9	No Data	No Data
2	Dipping a Dog	Dog	7.60e-04	No Data	1.09e-05	No Data	1381578.9	No Data	No Data
3a	Mixing/loading/applying Liquids With a Backpack Sprayer	Ornamentals	1.91e-01	1.13e-03	2.73e-03	1.61e-05	5490.2	280000.0	5384.6
3b	Mixing/loading/applying Wettable Powders With a Backpack Sprayer	Ornamentals	2.55e-01	1.50e-03	3.64e-03	2.14e-05	4117.6	210000.0	4038.5
		Peas	9.18e-02	5.40e-04	1.31e-03	7.71e-06	11437.9	583333.3	11217.9
		Potatoes	9.18e-02	5.40e-04	1.31e-03	7.71e-06	11437.9	583333.3	11217.9
		Fruit Trees	5.00e-01	2.94e-03	7.14e-03	4.20e-05	2100.8	107142.9	2060.4
4a	Mixing/loading/applying Liquids With a Low Pressure Handwand	Ornamentals	3.75e+00	1.13e-03	5.36e-02	1.61e-05	280.0	280000.0	279.7
4b	Mixing/loading/applying Wettable Powders With a Low Pressure Handwand	Ornamentals	1.25e+01	5.50e-02	1.79e-01	7.86e-04	84.0	5727.3	82.8
		Peas	4.50e+00	1.98e-02	6.43e-02	2.83e-04	233.3	15909.1	230.0
		Potatoes	4.50e+00	1.98e-02	6.43e-02	2.83e-04	233.3	15909.1	230.0
		Fruit Trees	2.45e+01	1.08e-01	3.50e-01	1.54e-03	42.9	2922.1	42.2
5a	Mixing/loading/applying Liquids With a Garden Hose-End Sprayer	Ornamentals	1.13e+00	3.56e-04	1.61e-02	5.09e-06	933.3	884210.5	932.3
5b	Mixing/loading/applying Wettable Powders With a Garden Hose-End Sprayer	Ornamentals	1.50e+00	4.75e-04	2.14e-02	6.79e-06	700.0	663157.9	699.3
		Peas	5.40e-01	1.71e-04	7.71e-03	2.44e-06	1944.4	1842105.3	1942.4
		Potatoes	5.40e-01	1.71e-04	7.71e-03	2.44e-06	1944.4	1842105.3	1942.4
		Fruit Trees	2.94e+00	9.31e-04	4.20e-02	1.33e-05	357.1	338345.9	356.8
6	Mixing/loading/applying Soluble Concentrates For Sprinkling	Fire Ants	2.70e+00	8.55e-04	3.86e-02	1.22e-05	388.9	368421.1	388.5

APPENDIX C: OCCUPATIONAL POSTAPPLICATION RISK ASSESSMENT FOR PHOSMET

Appendix C/Table 1 : Dislodgeable Foliar Residue Data for Oranges Excerpted From MRID 404253-01

Days After Treatment	Plot 1			Plot 2			Combined
	Phosmet Residue ($\mu g/cm^2$)	Phosmet Equiv. Oxon Residue ($\mu g/cm^2$)	Sum ($\mu g/cm^2$)	Phosmet Residue ($\mu g/cm^2$)	Phosmet Equiv. Oxon Residue ($\mu g/cm^2$)	Sum ($\mu g/cm^2$)	Average ($\mu g/cm^2$)
0	10.8	0.081	10.88	12.5	0.096	12.60	12
1	11.4	0.18	11.58	10.1	0.17	10.27	11
3	10.4	0.22	10.62	9.9	0.19	10.09	10
5	11.1	0.36	11.46	9.7	0.42	10.12	11
7	9.8	0 .36	10.16	9.2	0.38	9.58	9.9
10	9.4	0.47	9.87	8.1	0.44	8.54	9.2
14	8.8	0.56	9.36	7.8	0.71	8.51	8.9
21	7.9	0.61	8.51	6.7	0.61	7.31	7.9
28	6.7	0.66	7.36	6.2	0.66	6.86	7.1

The limit of quantification for the phosmet dislodgeable foliar residue method is 0.002 g/cm^2. The application rate in this study was 30 lb 50 WP/acre (i.e., 15 lb ai/acre) which is the current label maximum application rate. The sample size for this study was 480 cm^2/sample (i.e., 48 - 1 inch diameter leaf punches). Field recovery data were generated for both phosmet (84.4 %, CV 15.6, n 18) and phosmet oxon (89.6 %, 15.7, n 18). Phosmet oxon levels are presented as equivalents of the phosmet parent molecule which were calculated by using the empirically determined [oxon] and multiplying it by the ratio of the LD_{50} for the oxon/LD_{50} for phosmet parent.

Appendix C/Table 2 : Dislodgeable Foliar Residue Data for Pears Excerpted From MRID 404253-01

Days After Treatment	Plot 2		
	Phosmet Residue ($\mu g/cm^2$)	Phosmet Equiv. Oxon Residue ($\mu g/cm^2$)	Sum ($\mu g/cm^2$)
0	5.0	0.04	5.04
1	5.9	0.05	5.95
2	4.6	0.04	4.64
3	4.6	0.05	4.65
4	4.4	0.04	4.44
5	4.1	0.06	4.16
7	3.7	0.06	3.76
10	3.5	0.06	3.56
14	2.0	0.06	2.06
21	1.1	0.03	1.03
28	1.0	0.02	1.02

The limit of quantification for the phosmet dislodgeable foliar residue method is 0.002 g/cm^2. The application rate in this study was 10 lb 50 WP/acre (i.e., 5 lb ai/acre) which is the current label maximum application rate. The sample size for this study was 480 cm^2/sample (i.e., 48 - 1 inch diameter leaf punches). Field recovery data were generated for both phosmet (82.5 %, CV 9.3, n 8) and phosmet oxon (93.2 %, CV 7.0, n 10). Laboratory recoveries were similar to the field recovery. Phosmet oxon levels are presented as equivalents of the phosmet parent molecule which were calculated by using the empirically determined [oxon] and multiplying it by the ratio of the LD_{50} for the oxon/LD_{50} for phosmet parent. These data are used to assess both occupational and homeowner exposures.

Appendix C/Table 3 : Dislodgeable Foliar Residue Data for Grapes Excerpted From MRID 404253-01

Days After Treatment	Plot 1			Plot 2			Combined
	Phosmet Residue ($\mu g/cm^2$)	Phosmet Equiv. Oxon Residue ($\mu g/cm^2$)	Sum ($\mu g/cm^2$)	Phosmet Residue ($\mu g/cm^2$)	Phosmet Equiv. Oxon Residue ($\mu g/cm^2$)	Sum ($\mu g/cm^2$)	Average ($\mu g/cm^2$)
0	2.2	0.03	2.23	1.2	0.02	1.22	1.7
1	1.0	0.07	1.07	1.3	0.06	1.36	1.2
3	0.61	0.1	0.71	1.1	0.1	1.2	0.96
4	0.84	0.13	0.97	0.61	0.1	0.71	0.84
6	1.0	0.17	1.17	0.62	0.13	0.75	0.96
9	0.48	0.11	0.99	0.73	0.13	0.86	0.93
13	0.41	0.1	0.51	0.61	0.12	0.73	0.62
20	0.24	0.06	0.3	0.12	0.04	0.16	0.23
27	0.27	0.08	0.35	0.14	0.05	0.19	0.27

The limit of quantification for the phosmet dislodgeable foliar residue method is 0.002 g/cm^2. The application rate in this study was 2 lb 50 WP/acre (i.e., 1 lb ai/acre). The sample size for this study was 480 cm^2/sample (i.e., 48 - 1 inch diameter leaf punches). Field recovery data were generated for both phosmet (96.9 %, CV 6.4, n 7) and phosmet oxon (98.0 %, CV 5.2, n 9). Laboratory recoveries were similar to the field recovery. Phosmet oxon levels are presented as equivalents of the phosmet parent molecule which were calculated by using the empirically determined [oxon] and multiplying it by the ratio of the LD_{50} for the oxon/LD_{50} for phosmet parent.

Appendix C/Table 4: Dislodgeable Foliar Residue Levels Used In the Calculation of Restricted Entry						
DAT	BEST FIT DFR (ug/cm2)					
	ORANGES	PEARS	NUTS	APPLE (wc)	APPLE (ec)	GRAPES
0	12.000	5.040	5.998	4.032	1.512	1.700
1	11.797	4.717	5.613	3.774	1.415	1.588
2	11.597	4.415	5.254	3.532	1.324	1.484
3	11.400	4.132	4.917	3.306	1.240	1.386
4	11.207	3.867	4.602	3.094	1.160	1.295
5	11.017	3.620	4.307	2.896	1.086	1.209
6	10.830	3.388	4.031	2.710	1.016	1.130
7	10.646	3.171	3.773	2.537	0.951	1.055
8	10.466	2.968	3.531	2.374	0.890	0.986
9	10.288	2.777	3.305	2.222	0.833	0.921
10	10.114	2.599	3.093	2.080	0.780	0.860
11	9.942	2.433	2.895	1.946	0.730	0.804
12	9.774	2.277	2.710	1.822	0.683	0.751
13	9.608	2.131	2.536	1.705	0.639	0.701
14	9.445	1.995	2.374	1.596	0.598	0.655
15	9.285	1.867	2.222	1.493	0.560	0.612
16	9.128	1.747	2.079	1.398	0.524	0.572
17	8.973	1.635	1.946	1.308	0.491	0.534
18	8.821	1.531	1.821	1.224	0.459	0.499
19	8.671	1.432	1.705	1.146	0.430	0.466
20	8.524	1.341	1.595	1.073	0.402	0.435
21	8.380	1.255	1.493	1.004	0.376	0.407
22	8.238	1.174	1.398	0.940	0.352	0.380
23	8.098	1.099	1.308	0.879	0.330	0.355
24	7.961	1.029	1.224	0.823	0.309	0.332
25	7.826	0.963	1.146	0.770	0.289	0.310
26	7.693	0.901	1.072	0.721	0.270	0.289
27	7.563	0.843	1.004	0.675	0.253	0.270
28	7.434	0.789	0.939	0.632	0.237	0.253
29	7.308	0.739	0.879	0.591	0.222	0.236
30	7.184	0.692	0.823	0.553	0.207	0.220
31	7.063	0.647	0.770	0.518	0.194	0.206
32	6.943	0.606	0.721	0.485	0.182	0.192
33	6.825	0.567	0.675	0.454	0.170	0.180
34	6.709	0.531	0.631	0.424	0.159	0.168
35	6.596	0.497	0.591	0.397	0.149	0.157
36	6.484	0.465	0.553	0.372	0.139	0.146
37	6.374	0.435	0.518	0.348	0.131	0.137
38	6.266	0.407	0.485	0.326	0.122	0.128
39	6.160	0.381	0.453	0.305	0.114	0.119
40	6.055	0.357	0.424	0.285	0.107	0.112
41	5.952	0.334	0.397	0.267	0.100	0.104
42	5.852	0.312	0.372	0.250	0.094	0.097
43	5.752	0.292	0.348	0.234	0.088	0.091
44	5.655	0.274	0.326	0.219	0.082	0.085
45	5.559	0.256	0.305	0.205	0.077	0.079
46	5.465	0.240	0.285	0.192	0.072	0.074
47	5.372	0.224	0.267	0.180	0.067	0.069
48	5.281	0.210	0.250	0.168	0.063	0.065
49	5.191	0.197	0.234	0.157	0.059	0.060
50	5.103	0.184	0.219	0.147	0.055	0.056
51	5.017	0.172	0.205	0.138	0.052	0.053

Appendix C/Table 4: Dislodgeable Foliar Residue Levels Used In the Calculation of Restricted Entry						
DAT	BEST FIT DFR (ug/cm2)					
	ORANGES	PEARS	NUTS	APPLE (wc)	APPLE (ec)	GRAPES
52	4.932	0.161	0.192	0.129	0.048	0.049
53	4.848	0.151	0.179	0.121	0.045	0.046
54	4.766	0.141	0.168	0.113	0.042	0.043
55	4.685	0.132	0.157	0.106	0.040	0.040
56	4.606	0.124	0.147	0.099	0.037	0.038
57	4.528	0.116	0.138	0.093	0.035	0.035
58	4.451	0.108	0.129	0.087	0.032	0.033
59	4.375	0.101	0.121	0.081	0.030	0.031
60	4.301	0.095	0.113	0.076	0.028	0.029
Orange Application Rate (lb ai/acre):						15
Orange Slope:						-0.0171
[Inititial Orange] (ug/cm2):						12
Pear Application Rate (lb ai/acre):						5
Pear Slope:						-0.06621
[Initial Pear] (ug/cm2):						5.04
Grape Slope:						-0.0681
[Initial Grape] (ug/cm2):						1.7
Limit of Quantification (ug/cm2):						0.002
Nut Tree Application Rate (lb ai/A):						5.95
Apple Application Rate on West Coast (lb ai/A):						4
Apple Application Rate on East Coast (lb ai/A):						1.5

Appendix C/Table 5: Dose Levels Used In the Calculation of Restricted Entry Intervals								
DAT	DOSE (mg/kg/day)							
	SCEN 1				SCEN 2 GRAPES	SCEN 3 BLUEBERRIES	SCEN 4 PEAS	SCEN 5 SCOUTING
	PEARS	NUTS	APPLE (wc)	APPLE (ec)				
0	5.760	6.854	4.608	1.728	2.914	0.777	0.486	0.194
1	5.391	6.415	4.313	1.617	2.722	0.726	0.454	0.182
2	5.046	6.004	4.036	1.514	2.543	0.678	0.424	0.170
3	4.722	5.620	3.778	1.417	2.376	0.634	0.396	0.158
4	4.420	5.260	3.536	1.326	2.219	0.592	0.370	0.148
5	4.137	4.923	3.309	1.241	2.073	0.553	0.346	0.138
6	3.872	4.607	3.097	1.161	1.937	0.516	0.323	0.129
7	3.624	4.312	2.899	1.087	1.809	0.482	0.302	0.121
8	3.391	4.036	2.713	1.017	1.690	0.451	0.282	0.113
9	3.174	3.777	2.539	0.952	1.579	0.421	0.263	0.105
10	2.971	3.535	2.377	0.891	1.475	0.393	0.246	0.098
11	2.780	3.309	2.224	0.834	1.378	0.367	0.230	0.092
12	2.602	3.097	2.082	0.781	1.287	0.343	0.215	0.086
13	2.436	2.898	1.949	0.731	1.202	0.321	0.200	0.080
14	2.280	2.713	1.824	0.684	1.123	0.300	0.187	0.075
15	2.134	2.539	1.707	0.640	1.049	0.280	0.175	0.070
16	1.997	2.376	1.597	0.599	0.980	0.261	0.163	0.065
17	1.869	2.224	1.495	0.561	0.916	0.244	0.153	0.061
18	1.749	2.082	1.399	0.525	0.855	0.228	0.143	0.057
19	1.637	1.948	1.310	0.491	0.799	0.213	0.133	0.053
20	1.532	1.823	1.226	0.460	0.746	0.199	0.124	0.050
21	1.434	1.707	1.147	0.430	0.697	0.186	0.116	0.046
22	1.342	1.597	1.074	0.403	0.651	0.174	0.109	0.043
23	1.256	1.495	1.005	0.377	0.609	0.162	0.101	0.041
24	1.176	1.399	0.941	0.353	0.568	0.152	0.095	0.038
25	1.100	1.309	0.880	0.330	0.531	0.142	0.089	0.035
26	1.030	1.226	0.824	0.309	0.496	0.132	0.083	0.033
27	0.964	1.147	0.771	0.289	0.463	0.124	0.077	0.031
28	0.902	1.074	0.722	0.271	0.433	0.115	0.072	0.029
29	0.844	1.005	0.676	0.253	0.404	0.108	0.067	0.027
30	0.790	0.940	0.632	0.237	0.378	0.101	0.063	0.025
31	0.740	0.880	0.592	0.222	0.353	0.094	0.059	0.024
32	0.692	0.824	0.554	0.208	0.330	0.088	0.055	0.022
33	0.648	0.771	0.518	0.194	0.308	0.082	0.051	0.021
34	0.606	0.722	0.485	0.182	0.288	0.077	0.048	0.019
35	0.568	0.675	0.454	0.170	0.269	0.072	0.045	0.018
36	0.531	0.632	0.425	0.159	0.251	0.067	0.042	0.017
37	0.497	0.592	0.398	0.149	0.235	0.063	0.039	0.016
38	0.465	0.554	0.372	0.140	0.219	0.058	0.037	0.015
39	0.436	0.518	0.348	0.131	0.205	0.055	0.034	0.014
40	0.408	0.485	0.326	0.122	0.191	0.051	0.032	0.013
41	0.381	0.454	0.305	0.114	0.179	0.048	0.030	0.012
42	0.357	0.425	0.286	0.107	0.167	0.045	0.028	0.011
43	0.334	0.398	0.267	0.100	0.156	0.042	0.026	0.010
44	0.313	0.372	0.250	0.094	0.146	0.039	0.024	0.010
45	0.293	0.348	0.234	0.088	0.136	0.036	0.023	0.009
46	0.274	0.326	0.219	0.082	0.127	0.034	0.021	0.008
47	0.256	0.305	0.205	0.077	0.119	0.032	0.020	0.008

Appendix C/Table 5: Dose Levels Used In the Calculation of Restricted Entry Intervals								
DAT	DOSE (mg/kg/day)							
	SCEN 1				SCEN 2 GRAPES	SCEN 3 BLUEBERRIES	SCEN 4 PEAS	SCEN 5 SCOUTING
	PEARS	NUTS	APPLE (wc)	APPLE (ec)				
48	0.240	0.286	0.192	0.072	0.111	0.030	0.018	0.007
49	0.225	0.267	0.180	0.067	0.104	0.028	0.017	0.007
50	0.210	0.250	0.168	0.063	0.097	0.026	0.016	0.006
51	0.197	0.234	0.157	0.059	0.090	0.024	0.015	0.006
52	0.184	0.219	0.147	0.055	0.084	0.023	0.014	0.006
53	0.172	0.205	0.138	0.052	0.079	0.021	0.013	0.005
54	0.161	0.192	0.129	0.048	0.074	0.020	0.012	0.005
55	0.151	0.180	0.121	0.045	0.069	0.018	0.011	0.005
56	0.141	0.168	0.113	0.042	0.064	0.017	0.011	0.004
57	0.132	0.157	0.106	0.040	0.060	0.016	0.010	0.004
58	0.124	0.147	0.099	0.037	0.056	0.015	0.009	0.004
59	0.116	0.138	0.093	0.035	0.052	0.014	0.009	0.004
60	0.108	0.129	0.087	0.033	0.049	0.013	0.008	0.003
0-30 Day Avg.	0.253	0.301	0.202	0.076	0.126	0.033	0.021	0.008
15-45 Day Avg.	0.094	0.111	0.075	0.028	0.045	0.012	0.008	0.003
30-60 Day Avg.	0.035	0.041	0.028	0.010	0.016	0.004	0.003	0.001

ST & IT (≤30 days) Dermal Abs. (%):100
>30 Days Dermal Abs. (%):10
Uncertainty Factors:100
Occupational Scenario 1 TC (cm2/hour):10000
Occupational Scenario 2 TC (cm2/hour):15000
Occupational Scenario 3 TC (cm2/hour):4000
Occupational Scenario 4 TC (cm2/hour):2500
Occupational Scenario 5 TC (cm2/hour):1000
ST & IT (≤30 days) Dermal NOEL (mg/kg/day):15
IT (>30 days) Dermal NOEL (mg/kg/day):1.1
Adult Exposure Duration (hrs/day):8

Appendix C/Table 6: Restricted Entry Intervals For Risks On Pears, Grapes, Low Row Crops, and Apples								
DAT	MOES							
	SCEN 1				SCEN 2 GRAPES	SCEN 3 BLUEBERRIES	SCEN 4 PEAS	SCEN 5 SCOUTING
	PEARS	NUTS	APPLE (wc)	APPLE (ec)				
0	2.6	2.2	3.3	8.7	5.1	19.3	30.9	77.2
1	2.8	2.3	3.5	9.3	5.5	20.7	33.1	82.6
2	3.0	2.5	3.7	9.9	5.9	22.1	35.4	88.5
3	3.2	2.7	4.0	10.6	6.3	23.7	37.9	94.7
4	3.4	2.9	4.2	11.3	6.8	25.3	40.6	101.4
5	3.6	3.0	4.5	12.1	7.2	27.1	43.4	108.5
6	3.9	3.3	4.8	12.9	7.7	29.0	46.5	116.2
7	4.1	3.5	5.2	13.8	8.3	31.1	49.7	124.4
8	4.4	3.7	5.5	14.7	8.9	33.3	53.2	133.1
9	4.7	4.0	5.9	15.8	9.5	35.6	57.0	142.5
10	5.0	4.2	6.3	16.8	10.2	38.1	61.0	152.5
11	5.4	4.5	6.7	18.0	10.9	40.8	65.3	163.3
12	5.8	4.8	7.2	19.2	11.7	43.7	69.9	174.8
13	6.2	5.2	7.7	20.5	12.5	46.8	74.9	187.1
14	6.6	5.5	8.2	21.9	13.4	50.1	80.1	200.3
15	7.0	5.9	8.8	23.4	14.3	53.6	85.8	214.4
16	7.5	6.3	9.4	25.0	15.3	57.4	91.8	229.5
17	8.0	6.7	10.0	26.8	16.4	61.4	98.3	245.7
18	8.6	7.2	10.7	28.6	17.5	65.8	105.2	263.0
19	9.2	7.7	11.5	30.5	18.8	70.4	112.6	281.6
20	9.8	8.2	12.2	32.6	20.1	75.4	120.6	301.4
21	10.5	8.8	13.1	34.9	21.5	80.7	129.1	322.7
22	11.2	9.4	14.0	37.3	23.0	86.3	138.2	345.4
23	11.9	10.0	14.9	39.8	24.6	92.4	147.9	369.7
24	12.8	10.7	15.9	42.5	26.4	98.9	158.3	395.8
25	13.6	11.5	17.0	45.4	28.2	105.9	169.5	423.7
26	14.6	12.2	18.2	48.5	30.2	113.4	181.4	453.5
27	15.6	13.1	19.5	51.9	32.4	121.4	194.2	485.5
28	16.6	14.0	20.8	55.4	34.6	129.9	207.9	519.7
29	17.8	14.9	22.2	59.2	37.1	139.1	222.5	556.3
30	19.0	16.0	23.7	63.3	39.7	148.9	238.2	595.5
31	20.3	17.0	25.4	67.6	42.5	159.4	255.0	637.5
32	21.7	18.2	27.1	72.2	45.5	170.6	273.0	682.4
33	23.2	19.5	28.9	77.2	48.7	182.6	292.2	730.5
34	24.7	20.8	30.9	82.5	52.1	195.5	312.8	782.0
35	26.4	22.2	33.0	88.1	55.8	209.3	334.9	837.1
36	28.2	23.7	35.3	94.1	59.7	224.0	358.4	896.1
37	30.2	25.4	37.7	100.6	64.0	239.8	383.7	959.3
38	32.2	27.1	40.3	107.5	68.5	256.7	410.8	1026.9
39	34.4	28.9	43.1	114.8	73.3	274.8	439.7	1099.2
40	36.8	30.9	46.0	122.7	78.4	294.2	470.7	1176.7
41	39.3	33.0	49.1	131.1	84.0	314.9	503.9	1259.6
42	42.0	35.3	52.5	140.0	89.9	337.1	539.4	1348.4
43	44.9	37.7	56.1	149.6	96.2	360.9	577.4	1443.4
44	48.0	40.3	59.9	159.9	103.0	386.3	618.1	1545.1
45	51.2	43.1	64.1	170.8	110.3	413.5	661.6	1654.0
46	54.8	46.0	68.4	182.5	118.0	442.7	708.2	1770.6
47	58.5	49.2	73.1	195.0	126.4	473.8	758.2	1895.4
48	62.5	52.5	78.1	208.3	135.3	507.2	811.6	2029.0
49	66.8	56.1	83.5	222.6	144.8	543.0	868.8	2171.9
50	71.4	60.0	89.2	237.8	155.0	581.3	930.0	2325.0

Appendix C/Table 6: Restricted Entry Intervals For Risks On Pears, Grapes, Low Row Crops, and Apples								
DAT	MOES							
	SCEN 1				SCEN 2 GRAPES	SCEN 3 BLUEBERRIES	SCEN 4 PEAS	SCEN 5 SCOUTING
	PEARS	NUTS	APPLE (wc)	APPLE (ec)				
51	76.2	64.1	95.3	254.1	165.9	622.2	995.5	2488.8
52	81.5	68.4	101.8	271.5	177.6	666.1	1065.7	2664.2
53	87.0	73.1	108.8	290.1	190.1	713.0	1140.8	2852.0
54	93.0	78.1	116.2	310.0	203.5	763.2	1221.2	3053.0
55	99.4	83.5	124.2	331.2	217.9	817.0	1307.3	3268.1
56	106.2	89.2	132.7	353.8	233.2	874.6	1399.4	3498.5
57	113.4	95.3	141.8	378.1	249.7	936.2	1498.0	3745.0
58	121.2	101.8	151.5	403.9	267.3	1002.2	1603.6	4008.9
59	129.5	108.8	161.8	431.6	286.1	1072.9	1716.6	4291.4
60	138.3	116.3	172.9	461.1	306.3	1148.5	1837.5	4593.9
0-30 Day Avg.	4.4	3.7	5.4	14.5	8.8	32.9	52.6	131.5
15-45 Day Avg.	11.7	9.9	14.7	39.2	24.3	91.3	146.1	365.1
30-60 Day Avg.	31.7	26.7	39.6	105.7	67.6	253.5	405.6	1014.1

ST & IT (≤30 days) Dermal Abs. (%):100
>30 Days Dermal Abs. (%):10
Uncertainty Factors:100
Occupational Scenario 1 TC (cm2/hour):10000
Occupational Scenario 2 TC (cm2/hour):15000
Occupational Scenario 3 TC (cm2/hour):4000
Occupational Scenario 4 TC (cm2/hour):2500
Occupational Scenario 5 TC (cm2/hour):1000
ST & IT (≤30 days) Dermal NOEL (mg/kg/day):15
IT (>30 days) Dermal NOEL (mg/kg/day):1.1
Adult Exposure Duration (hrs/day):8

APPENDIX D: RESIDENTIAL POSTAPPLICATION RISK ASSESSMENT FOR PHOSMET

Appendix D/Table 1 : Dislodgeable Foliar Residue Data for Pears Excerpted From MRID 404253-01

Days After Treatment	Plot 2		
	Phosmet Residue ($\mu g/cm^2$)	Phosmet Equiv. Oxon Residue ($\mu g/cm^2$)	Sum ($\mu g/cm^2$)
0	5.0	0.04	5.04
1	5.9	0.05	5.95
2	4.6	0.04	4.64
3	4.6	0.05	4.65
4	4.4	0.04	4.44
5	4.1	0.06	4.16
7	3.7	0.06	3.76
10	3.5	0.06	3.56
14	2.0	0.06	2.06
21	1.1	0.03	1.03
28	1.0	0.02	1.02

The limit of quantification for the phosmet dislodgeable foliar residue method is 0.002 g/cm^2. The application rate in this study was 10 lb 50 WP/acre (i.e., 5 lb ai/acre) which is the current label maximum application rate. The sample size for this study was 480 cm^2/sample (i.e., 48 - 1 inch diameter leaf punches). Field recovery data were generated for both phosmet (82.5 %, CV 9.3, n 8) and phosmet oxon (93.2 %, CV 7.0, n 10). Laboratory recoveries were similar to the field recovery. Phosmet oxon levels are presented as equivalents of the phosmet parent molecule which were calculated by using the empirically determined [oxon] and multiplying it by the ratio of the LD_{50} for the oxon/LD_{50} for phosmet parent. These data are used to assess both occupational and homeowner exposures.

Appendix D/Table 2: Empirical Dermal Exposure Data For Homeowners From MRID 401223-01 and Transfer Coefficient Calculation Based on MRID 404253-01

Days After Treatment (DAT)	Dermal Exposure (mg phosmet/30 minute replicate)[a]			DFR (g/cm^2)			Transfer Coefficient (cm^2/hr) [c]
	Head & Neck	Hands	Total	Phosmet Residue	Phosmet Equiv. Oxon Residue	Total	
0	0.36	13.2	13.6	5.0	0.04	5.04	5397
1	0.77	13.3	14.1	5.9	0.05	5.95	4739
2	0.57	15.4	16.0	4.6	0.04	4.64	6897
3	0.38	10.4	10.8	4.6	0.05	4.65	4645
4	0.33	10.7	11.0	4.4	0.04	4.44	4955
5	0.31	9.44	9.75	4.1	0.06	4.16	4688
7	0.30	7.52	7.82	3.7	0.06	3.76	4160
14	0.30	4.39	4.69	2.0	0.06	2.06	4553
						Average TC	5004

a Homeowner dermal exposure to phosmet using dermal dosimetry data (MRID # 401223-01). Values presented are averages of the 4 replicates monitored on Days 0 through 7 and the 2 replicates monitored on Day 14.
b DFR phosmet residue to pears (MRID # 404253-01) that were collected concurrently with the dermal exposure data. The DFR values reported are averages of 3 sampling replicates on each day.
c Transfer coefficients were calculated by as follows: total dermal exposure (mg/30 minutes) * 2 (conversion to an hourly exposure rate)* (1,000 ug/mg)/DFR (µg/cm^2)
d Average transfer coefficient is 5004 ± 841 (CV 16.8).

Appendix D/Table 3: MOEs Attributable To Dermal Exposure For Adults Involved In The Harvesting And Maintaining Of Pears and Apples

DAT	BEST FIT DFR (ug/cm2)			DOSE (mg/kg/day)			MOEs		
	Pears	Apples (wc)	Apples (ec)	Pears	Apples (wc)	Apples (ec)	Pears	Apples (wc)	Apples (ec)
0	5.04	4.032	1.512	0.241	0.193	0.072	62	78	207
1	4.72	3.774	1.415	0.226	0.181	0.068	66	83	221
2	4.41	3.532	1.324	0.211	0.169	0.063	71	89	237
3	4.13	3.306	1.240	0.198	0.158	0.059	76	95	253
4	3.87	3.094	1.160	0.185	0.148	0.056	81	101	270
5	3.62	2.896	1.086	0.173	0.139	0.052	87	108	289
6	3.39	2.710	1.016	0.162	0.130	0.049	93	116	308
7	3.17	2.537	0.951	0.152	0.121	0.046	99	124	330
8	2.97	2.374	0.890	0.142	0.114	0.043	106	132	352
9	2.78	2.222	0.833	0.133	0.106	0.040	113	141	376
10	2.60	2.080	0.780	0.124	0.100	0.037	121	151	402
11	2.43	1.946	0.730	0.116	0.093	0.035	129	161	429
12	2.28	1.822	0.683	0.109	0.087	0.033	138	172	459
13	2.13	1.705	0.639	0.102	0.082	0.031	147	184	490
14	1.99	1.596	0.598	0.095	0.076	0.029	157	196	524
15	1.87	1.493	0.560	0.089	0.071	0.027	168	210	560
16	1.75	1.398	0.524	0.084	0.067	0.025	179	224	598
17	1.64	1.308	0.491	0.078	0.063	0.023	192	240	639
18	1.53	1.224	0.459	0.073	0.059	0.022	205	256	683
19	1.43	1.146	0.430	0.069	0.055	0.021	219	274	729
20	1.34	1.073	0.402	0.064	0.051	0.019	234	292	779
21	1.25	1.004	0.376	0.060	0.048	0.018	250	312	833
22	1.17	0.940	0.352	0.056	0.045	0.017	267	334	890
23	1.10	0.879	0.330	0.053	0.042	0.016	285	356	950
24	1.03	0.823	0.309	0.049	0.039	0.015	305	381	1016
25	0.96	0.770	0.289	0.046	0.037	0.014	326	407	1085
26	0.90	0.721	0.270	0.043	0.035	0.013	348	435	1159
27	0.84	0.675	0.253	0.040	0.032	0.012	372	465	1239
28	0.79	0.632	0.237	0.038	0.030	0.011	397	496	1323
29	0.74	0.591	0.222	0.035	0.028	0.011	424	530	1414
30	0.69	0.553	0.207	0.033	0.026	0.010	453	567	1511
Avg.	2.21	1.77	0.66	0.011	0.008	0.003	104	130	346

Pear Slope-0.06621
[Initial Pear] (ug/cm2):5.04
Pear Application Rate (lb ai/acre):5
Short- & Int. (≤30 days) endpoint (mg/kg/day):15
Adult BW (kg):70
Child BW (kg):39.1
Adult Duration (hr/day):0.67
Child Duration (hr/day):0.67
Adult Exposure TC (cm2/hr):5000
Child Exposure TC (cm2/hr):2500
Dermal Absorption ≤30 Days (%):100

Appendix D/Table 4: MOEs Attributable To Dermal Exposure For Youth-aged Children Involved In The Harvesting And Maintaining Of Pears and Apples

DAT	BEST FIT DFR (ug/cm2)			DOSE (mg/kg/day)			MOEs		
	Pears	Apples (wc)	Apples (ec)	Pears	Apples (wc)	Apples (ec)	Pears	Apples (wc)	Apples (ec)
0	5.04	4.032	1.512	0.216	0.173	0.065	69	87	232
1	4.72	3.774	1.415	0.202	0.162	0.061	74	93	247
2	4.41	3.532	1.324	0.189	0.151	0.057	79	99	264
3	4.13	3.306	1.240	0.177	0.142	0.053	85	106	282
4	3.87	3.094	1.160	0.166	0.133	0.050	91	113	302
5	3.62	2.896	1.086	0.155	0.124	0.047	97	121	322
6	3.39	2.710	1.016	0.145	0.116	0.044	103	129	345
7	3.17	2.537	0.951	0.136	0.109	0.041	110	138	368
8	2.97	2.374	0.890	0.127	0.102	0.038	118	147	393
9	2.78	2.222	0.833	0.119	0.095	0.036	126	158	420
10	2.60	2.080	0.780	0.111	0.089	0.033	135	168	449
11	2.43	1.946	0.730	0.104	0.083	0.031	144	180	480
12	2.28	1.822	0.683	0.098	0.078	0.029	154	192	513
13	2.13	1.705	0.639	0.091	0.073	0.027	164	205	548
14	1.99	1.596	0.598	0.085	0.068	0.026	176	219	585
15	1.87	1.493	0.560	0.080	0.064	0.024	188	234	625
16	1.75	1.398	0.524	0.075	0.060	0.022	200	250	668
17	1.64	1.308	0.491	0.070	0.056	0.021	214	268	714
18	1.53	1.224	0.459	0.066	0.052	0.020	229	286	763
19	1.43	1.146	0.430	0.061	0.049	0.018	244	306	815
20	1.34	1.073	0.402	0.057	0.046	0.017	261	326	871
21	1.25	1.004	0.376	0.054	0.043	0.016	279	349	930
22	1.17	0.940	0.352	0.050	0.040	0.015	298	373	994
23	1.10	0.879	0.330	0.047	0.038	0.014	319	398	1062
24	1.03	0.823	0.309	0.044	0.035	0.013	340	425	1135
25	0.96	0.770	0.289	0.041	0.033	0.012	364	455	1212
26	0.90	0.721	0.270	0.039	0.031	0.012	389	486	1295
27	0.84	0.675	0.253	0.036	0.029	0.011	415	519	1384
28	0.79	0.632	0.237	0.034	0.027	0.010	444	554	1479
29	0.74	0.591	0.222	0.032	0.025	0.010	474	592	1580
30	0.69	0.553	0.207	0.030	0.024	0.009	506	633	1688
Avg	2.21	1.77	0.66	0.009	0.008	0.003	116	145	387

Pear Slope-0.06621
[Initial Pear] (ug/cm2):5.04
Pear Application Rate (lb ai/acre):5
Short- & Int. (≤30 days) endpoint (mg/kg/day):15
Adult BW (kg):70
Child BW (kg):39.1
Adult Duration (hr/day):0.67
Child Duration (hr/day):0.67
Adult Exposure TC (cm2/hr):5000
Child Exposure TC (cm2/hr):2500
Dermal Absorption ≤30 Days (%):100

Appendix D/Table 5: Risks Attributable to Dermal Contact With Phosmet Treated Pets (Dogs)												
DAT	AVAILABLE PHOSMET (mg ai/dog)		DEPOSITION (mg/cm2)		PETTING DOSE (mg/kg/day)				PETTING MOE			
					ADULTS		CHILDREN		ADULTS		CHILDREN	
	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE
0	254.2	5992.8	0.13612	0.40660	0.36320	8.56114	1.69493	39.95200	41.3	1.8	8.9	0.4
1	241.5	5693.2	0.12931	0.38627	0.34504	8.13309	1.61019	37.95440	43.5	1.8	9.3	0.4
2	229.5	5408.5	0.12285	0.36696	0.32779	7.72643	1.52968	36.05668	45.8	1.9	9.8	0.4
3	218.0	5138.1	0.11671	0.34861	0.31140	7.34011	1.45319	34.25385	48.2	2.0	10.3	0.4
4	207.1	4881.2	0.11087	0.33118	0.29583	6.97310	1.38053	32.54115	50.7	2.2	10.9	0.5
5	196.7	4637.1	0.10533	0.31462	0.28104	6.62445	1.31151	30.91410	53.4	2.3	11.4	0.5
6	186.9	4405.3	0.10006	0.29889	0.26699	6.29323	1.24593	29.36839	56.2	2.4	12.0	0.5
7	177.5	4185.0	0.09506	0.28395	0.25364	5.97857	1.18364	27.89997	59.1	2.5	12.7	0.5
8	168.7	3975.7	0.09030	0.26975	0.24095	5.67964	1.12445	26.50497	62.3	2.6	13.3	0.6
9	160.2	3777.0	0.08579	0.25626	0.22891	5.39566	1.06823	25.17972	65.5	2.8	14.0	0.6
10	152.2	3588.1	0.08150	0.24345	0.21746	5.12587	1.01482	23.92074	69.0	2.9	14.8	0.6
11	144.6	3408.7	0.07743	0.23128	0.20659	4.86958	0.96408	22.72470	72.6	3.1	15.6	0.7
12	137.4	3238.3	0.07355	0.21971	0.19626	4.62610	0.91587	21.58847	76.4	3.2	16.4	0.7
13	130.5	3076.4	0.06988	0.20873	0.18645	4.39479	0.87008	20.50904	80.5	3.4	17.2	0.7
14	124.0	2922.5	0.06638	0.19829	0.17712	4.17506	0.82658	19.48359	84.7	3.6	18.1	0.8
15	117.8	2776.4	0.06306	0.18838	0.16827	3.96630	0.78525	18.50941	89.1	3.8	19.1	0.8
16	111.9	2637.6	0.05991	0.17896	0.15985	3.76799	0.74599	17.58394	93.8	4.0	20.1	0.9
17	106.3	2505.7	0.05691	0.17001	0.15186	3.57959	0.70869	16.70474	98.8	4.2	21.2	0.9
18	101.0	2380.4	0.05407	0.16151	0.14427	3.40061	0.67325	15.86951	104.0	4.4	22.3	0.9
19	95.9	2261.4	0.05137	0.15343	0.13705	3.23058	0.63959	15.07603	109.4	4.6	23.5	1.0
20	91.1	2148.3	0.04880	0.14576	0.13020	3.06905	0.60761	14.32223	115.2	4.9	24.7	1.0
21	86.6	2040.9	0.04636	0.13847	0.12369	2.91560	0.57723	13.60612	121.3	5.1	26.0	1.1
22	82.3	1938.9	0.04404	0.13155	0.11751	2.76982	0.54837	12.92581	127.7	5.4	27.4	1.2
23	78.1	1841.9	0.04184	0.12497	0.11163	2.63133	0.52095	12.27952	134.4	5.7	28.8	1.2
24	74.2	1749.8	0.03975	0.11872	0.10605	2.49976	0.49490	11.66555	141.4	6.0	30.3	1.3
25	70.5	1662.3	0.03776	0.11279	0.10075	2.37477	0.47016	11.08227	148.9	6.3	31.9	1.4
26	67.0	1579.2	0.03587	0.10715	0.09571	2.25603	0.44665	10.52815	156.7	6.6	33.6	1.4
27	63.6	1500.3	0.03408	0.10179	0.09093	2.14323	0.42432	10.00175	165.0	7.0	35.4	1.5
28	60.5	1425.2	0.03237	0.09670	0.08638	2.03607	0.40310	9.50166	173.7	7.4	37.2	1.6
29	57.4	1354.0	0.03075	0.09187	0.08206	1.93427	0.38295	9.02658	182.8	7.8	39.2	1.7
30	54.6	1286.3	0.02922	0.08727	0.07796	1.83755	0.36380	8.57525	192.4	8.2	41.2	1.7
30 DAY AVG:					0.01865	0.43971	0.08705	2.05197	59.0	2.5	12.6	0.5

TRANSFERABLE (%):20
DAILY DISSIPATION (%): 5
EXPOSURE RATE (%):10
RATE (large dog: lb ai/animal): 0.066
RATE (small dog: lb ai/animal): 0.0028
CHILD BODY WEIGHT (kg): 15
SMALL DOG SIZE (lb): 5
LARGE DOG SIZE (lb): 120

Appendix D/Table 6: Toddler Risks Attributable to Hand-To-Mouth Activity After Contact With Phosmet Treated Pets (Dogs)								
DAT	AVAILABLE PHOSMET (mg ai/dog)		DEPOSITION (mg/cm2)		CHILDREN & HAND TO MOUTH			
					DOSE (mg/kg/day)		MOEs	
	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE
0	254.2	5992.8	0.13612	0.40660	3.62987	10.84275	1.240	0.415
1	241.5	5693.2	0.12931	0.38627	3.44837	10.30061	1.305	0.437
2	229.5	5408.5	0.12285	0.36696	3.27595	9.78558	1.374	0.460
3	218.0	5138.1	0.11671	0.34861	3.11216	9.29630	1.446	0.484
4	207.1	4881.2	0.11087	0.33118	2.95655	8.83148	1.522	0.510
5	196.7	4637.1	0.10533	0.31462	2.80872	8.38991	1.602	0.536
6	186.9	4405.3	0.10006	0.29889	2.66829	7.97041	1.686	0.565
7	177.5	4185.0	0.09506	0.28395	2.53487	7.57189	1.775	0.594
8	168.7	3975.7	0.09030	0.26975	2.40813	7.19330	1.869	0.626
9	160.2	3777.0	0.08579	0.25626	2.28772	6.83363	1.967	0.659
10	152.2	3588.1	0.08150	0.24345	2.17334	6.49195	2.071	0.693
11	144.6	3408.7	0.07743	0.23128	2.06467	6.16736	2.180	0.730
12	137.4	3238.3	0.07355	0.21971	1.96144	5.85899	2.294	0.768
13	130.5	3076.4	0.06988	0.20873	1.86336	5.56604	2.415	0.808
14	124.0	2922.5	0.06638	0.19829	1.77020	5.28774	2.542	0.851
15	117.8	2776.4	0.06306	0.18838	1.68169	5.02335	2.676	0.896
16	111.9	2637.6	0.05991	0.17896	1.59760	4.77218	2.817	0.943
17	106.3	2505.7	0.05691	0.17001	1.51772	4.53357	2.965	0.993
18	101.0	2380.4	0.05407	0.16151	1.44184	4.30689	3.121	1.045
19	95.9	2261.4	0.05137	0.15343	1.36974	4.09155	3.285	1.100
20	91.1	2148.3	0.04880	0.14576	1.30126	3.88697	3.458	1.158
21	86.6	2040.9	0.04636	0.13847	1.23619	3.69262	3.640	1.219
22	82.3	1938.9	0.04404	0.13155	1.17438	3.50799	3.832	1.283
23	78.1	1841.9	0.04184	0.12497	1.11566	3.33259	4.033	1.350
24	74.2	1749.8	0.03975	0.11872	1.05988	3.16596	4.246	1.421
25	70.5	1662.3	0.03776	0.11279	1.00689	3.00766	4.469	1.496
26	67.0	1579.2	0.03587	0.10715	0.95654	2.85728	4.704	1.575
27	63.6	1500.3	0.03408	0.10179	0.90872	2.71442	4.952	1.658
28	60.5	1425.2	0.03237	0.09670	0.86328	2.57870	5.213	1.745
29	57.4	1354.0	0.03075	0.09187	0.82012	2.44976	5.487	1.837
30	54.6	1286.3	0.02922	0.08727	0.77911	2.32727	5.776	1.934
30 DAY AVG:					1.86433	5.56893	0.590	0.198

TRANSFERABLE (%):20
DAILY DISSIPATION (%):5
RATE (large dog: lb ai/animal):0.066
RATE (small dog: lb ai/animal):0.0028
SALIVA EXTRACTION FACTOR (%):50
HAND TO MOUTH FREQUENCY (per hour):20
CHILD BODY WEIGHT (kg):15
CHILD HR/DAY:2
HAND SURFACE AREA (cm2):20
SMALL DOG SIZE (lb):5
LARGE DOG SIZE (lb):120

Table 7: Toddler Risks Attributable to Dermal Contact With Treated Pets Along With Hand-To-Mouth Activity After Contact With Phosmet Treated Pets (Dogs)						
DAT	AVAILABLE PHOSMET (mg ai/dog)		DEPOSITION (mg/cm2)		AGGREGATE MOES	
	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE
0	254.2	5992.8	0.13612	0.40660	1.087	0.197
1	241.5	5693.2	0.12931	0.38627	1.145	0.208
2	229.5	5408.5	0.12285	0.36696	1.205	0.218
3	218.0	5138.1	0.11671	0.34861	1.268	0.230
4	207.1	4881.2	0.11087	0.33118	1.335	0.242
5	196.7	4637.1	0.10533	0.31462	1.405	0.255
6	186.9	4405.3	0.10006	0.29889	1.479	0.268
7	177.5	4185.0	0.09506	0.28395	1.557	0.282
8	168.7	3975.7	0.09030	0.26975	1.639	0.297
9	160.2	3777.0	0.08579	0.25626	1.725	0.313
10	152.2	3588.1	0.08150	0.24345	1.816	0.329
11	144.6	3408.7	0.07743	0.23128	1.912	0.347
12	137.4	3238.3	0.07355	0.21971	2.012	0.365
13	130.5	3076.4	0.06988	0.20873	2.118	0.384
14	124.0	2922.5	0.06638	0.19829	2.230	0.404
15	117.8	2776.4	0.06306	0.18838	2.347	0.425
16	111.9	2637.6	0.05991	0.17896	2.471	0.448
17	106.3	2505.7	0.05691	0.17001	2.601	0.471
18	101.0	2380.4	0.05407	0.16151	2.738	0.496
19	95.9	2261.4	0.05137	0.15343	2.882	0.522
20	91.1	2148.3	0.04880	0.14576	3.033	0.550
21	86.6	2040.9	0.04636	0.13847	3.193	0.579
22	82.3	1938.9	0.04404	0.13155	3.361	0.609
23	78.1	1841.9	0.04184	0.12497	3.538	0.641
24	74.2	1749.8	0.03975	0.11872	3.724	0.675
25	70.5	1662.3	0.03776	0.11279	3.920	0.711
26	67.0	1579.2	0.03587	0.10715	4.126	0.748
27	63.6	1500.3	0.03408	0.10179	4.344	0.787
28	60.5	1425.2	0.03237	0.09670	4.572	0.829
29	57.4	1354.0	0.03075	0.09187	4.813	0.872
30	54.6	1286.3	0.02922	0.08727	5.066	0.918
30 DAY AVG:					0.564	0.144